R. R. KELL

THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[REGISTERED AS A NEWSPAPER.]

VOL. XXIX. No. 719.] LONDON, FEBRUARY 20, 1877. [29TH YEAR.] Price 6d.

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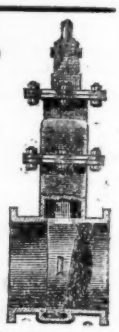
TELEGRAPH TUBES OR POLES, &c., &c.

C. & W. WALKERS' DOUBLE-FACED GAS-VALVES.



These solidly constructed double-faced Gas-Valves have taken the place of the old system of the light, single-faced disc, which is too uncertain and unreliable in large bores.

They are guaranteed absolutely gas-tight. They are very massive and rigid, and by improved modes of manufacture they are produced at very little excess in cost over the old light, weak system, which is liable to spring and bend, and become leaky.

The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

A spring in two short halves, and, therefore, not liable to break, is used only for scraping the front facing clean.

The front facing is vertical; the back facing forms the wedge.

At a slight additional expense both flanges are faced to bolt to main-pipes.

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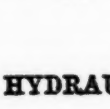

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By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

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The superiority of the material supplied by this Company is generally recognized, and it is now in use in nearly all the London and most of the large Provincial Gas-Works.

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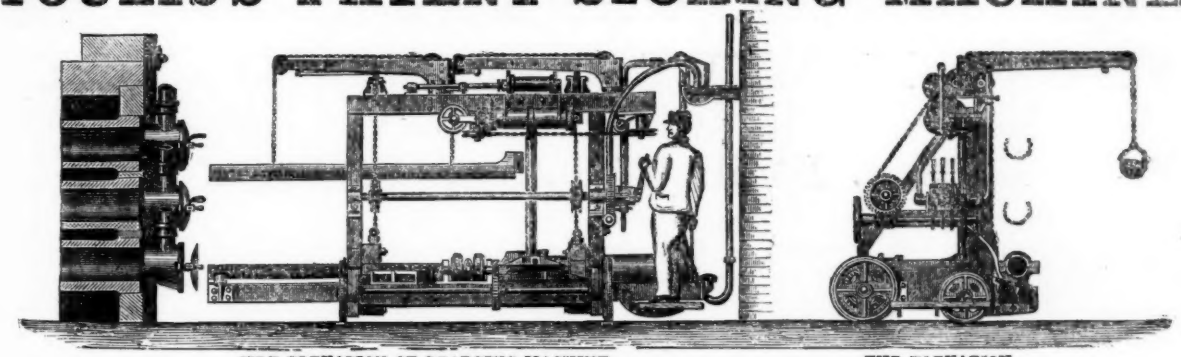

SIDE ELEVATION OF CHARGING MACHINE. END ELEVATION

(The Drawing Machine will be Illustrated in next week's Advertisement.)

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SPECIAL NOTICE.—Our Patent Machine-made Retorts have now been in *actual work* nearly 800 days, and are yet in good order. References on application.

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Attention is called to their Dry Meters in Wood Cases, as used by the principal London Gas Companies. These Meters are especially suitable for seaport towns and for export.

The Company repair or convert every description of Wet Gas-Meters to De Castro and Burton's Patent.

HODGE & CO.'S

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WITH TALC REFLECTORS AND SELF-ACTING VALVES TO PREVENT DOWN-DRAUGHT;

VENTILATING GLOBE LIGHTS for DINING-ROOMS, LIBRARIES, &c.

Ormolu, Bronze, & Crystal Gaseliers;

MEDIÆVAL CHURCH WORK AND CORONÆ

COCKS, VALVES, and FITTINGS for GAS, STEAM, and WATER;

COLUMNS, BRACKETS, & STREET LANTERNS;

BLACK AND GALVANIZED BARREL COMPO AND TIN PIPE.

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Drawings and Prices upon application.

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PATENT MARKET GAS STAND-PIPE,

MANUFACTURED BY

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This removable Service or Stand Pipe is suitable for lighting markets and other places, for taking pressures, or for any purpose where only occasional or periodical additional public lights or connexions are required.

The apparatus consists of a vertical pipe, the lower end of which is fixed to the main or collar, and the upper end to a box like a common syphon-box. Into this box is fastened a plate having a plug or valve thereon. The valve or barrel is fitted to a fixed seat or plug capable of turning upon it, and is square on the outside, and of such size as to fit a collar made to slip over it, the joint between the collar and the plug being made gas-tight by the former being forced down upon an india-rubber washer, by certain projections coming in contact with other projections formed in the interior of a cap or cover which surrounds the valve and collar before described. The top of the cover has a round hole with a notch or key-way on its opposite sides to admit of the projections or feathers on the collar passing through and on to the plug. To the collar is fixed the stand or service pipe, which is provided with an ordinary stopcock and gas-burner or pressure-gauge at its upper end. The action of the apparatus is simple. When it is desired to make the attachment, a service or stand pipe furnished with a collar, as described, is thrust down through the cap or cover, and, on being turned, will fix or jam itself tightly, so as to remain firmly upright, and at the same time turn on the gas from the main beneath. The action of removing the pipe effectually shuts off the gas, thereby ensuring great security against fraud, and loss by leakage.

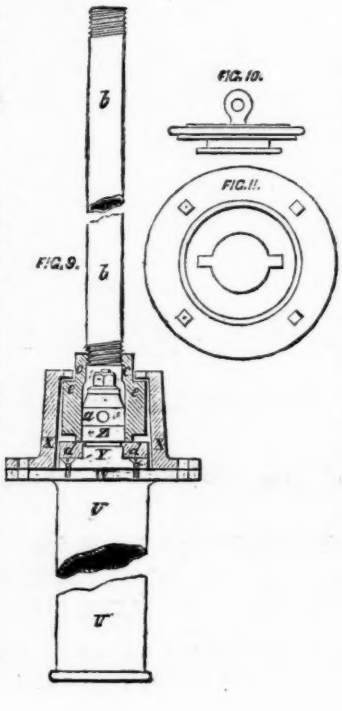

Fig. 9 represents the arrangement for the attachment of removable market or other gas stand-pipes. The view is a side elevation and part section. To the top of the service, U, is fixed a plate, W, and upon that is fastened by bolts the case or box, X. To the plate, W, is also fixed, by screws, the plug or valve, Y, and upon this plug the barrel Z is free to turn. That part of the barrel marked *a* is square. The stand-pipe, *b*, has attached to its lower end the collar, *c*, which is square in the interior, so as to slip over and turn the barrel by the square part, *a*, until the hole in the plug and that in the barrel coincide, when a gas-way will be established between the service, U, and the stand-pipe, *b*. A gas-tight joint between the collar, *c*, and the plate of the plug or valve, Y, is made by the former being forced down upon an india-rubber washer, *d*, by the upper part of the feathers, *e*, of the collar, *c*, coming in contact with inclined projections cast on the inner side of the box, X.

Fig. 10 is a plan of the top of the box or case containing the valve.

Price 15s.

Notice to Gas Companies

UNDER THE GAS-WORKS CLAUSES ACT, 1871, &c.

THE "LONDON" STANDARD BURNER,

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For 14-candle and 16-candle Gas, as certified by the Board of Trade.

This Standard Burner, for verifying the illuminating power of 14 and 16-candle gases, has been re-adopted by the Corporation of the City of London and the Metropolitan Board of Works.

Vide **"The Gaslight and Coke Company's Act, 1876";**
"South Metropolitan Gas Company's Act, 1876"; and
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The Metropolitan Gas Referees have re-verified and deposited Models of the Burner with the Board of Trade, which have been duly certified. One of them has now to be deposited with the Warden of the Standards.

As soon as this is done, I shall be in a position to supply Copies of the Standard Burner, engraved in accordance with the instructions of the Board of Trade, enclosed in Mahogany Box with Glasses complete.

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CATHELS'S PATENT GAS-WASHER
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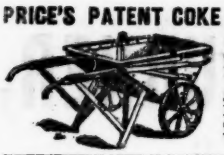
For prices, &c., apply to the manufacturers, the HORSELEY COMPANY, Tipton, STAFFORDSHIRE.

PRICE'S PATENT COKE & COAL BARROW



effecting a great saving of time, labour, and expense.
For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

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J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.
Communications addressed to J. SUGG & CO., GHENT, will receive immediate attention.

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WILLIAM FRASER,
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Owner of the Works at which Fire-Clay Retorts were first made), can supply
RETORTS, FIRE-BRICKS, &c.,
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References can be given to managers of above a hundred Gas-Works whom he supplies.
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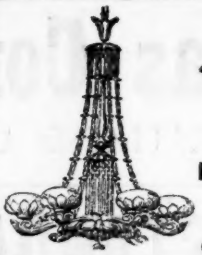

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Manufacturers of FIRE-BRICKS, LUMPS, TILES,

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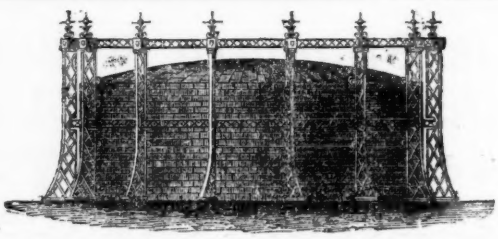

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Supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, &c.
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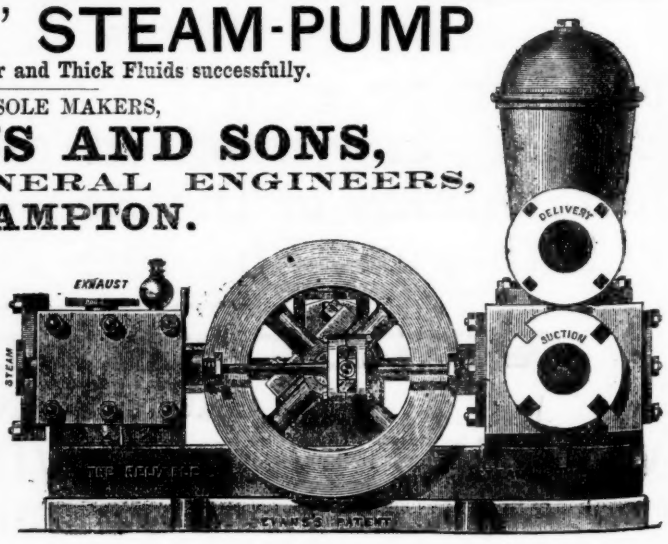

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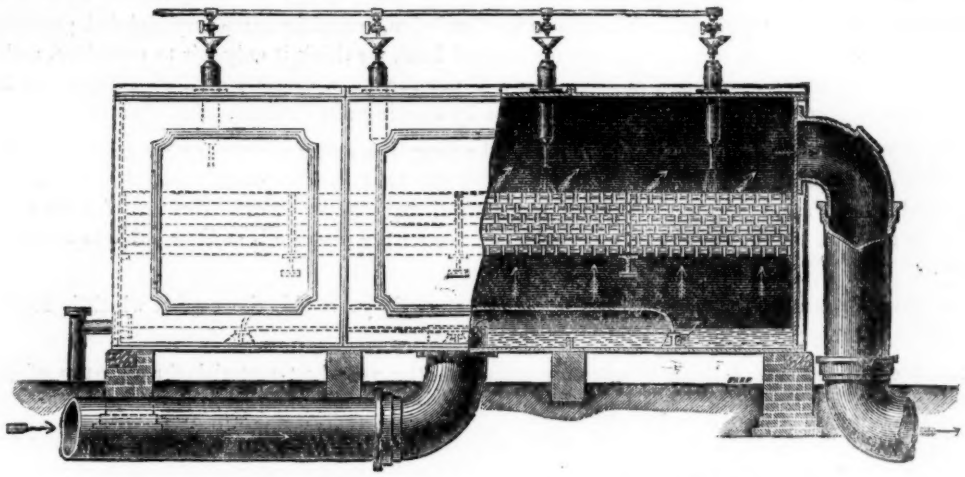

MECHANICAL ARRANGEMENT.

The Washer Tank contains a large bottom chamber, into which the Gas is freely admitted through an ordinary full-way inlet-pipe, passing first under an inverted vessel which removes any Tar remaining in the Gas after leaving the Condenser; it then rises slowly over the whole surface, CONTAINING AN AREA OF ABOUT EIGHT TIMES THAT OF THE INLET-PIPE, through equidistant spaces in a series of Self-Sealing Water Troughs, arranged in tiers, dividing itself and passing through the various dips until it reaches the upper chamber, and from thence through the outlet-main.

The washing liquid being CLEAN WATER is admitted by the Syphon inlets on top of Tank to the upper row of troughs, running through each successive tier, and becoming impregnated with the impurities extracted from the Gas, gaining strength at each dip on its descent, and finally passing off by the outlet syphon at the bottom.

It will be observed that in this Scrubber-Washer the Gas comes first in contact with THE STRONGEST LIQUOR at the bottom, and passes through WEAKER LIQUOR at each successive tier, until it issues through CLEAN WATER into the upper chamber; hence the true principle of Gas Purification by Washing is simply and automatically effected.

ADVANTAGES.

Great economy in first cost and foundations.
Great saving of other purifying apparatus and material.
Occupies little space, and stands only a few feet in height.
Being entirely self-acting, requires no motive power either for purifying or distributing.
The Gas is washed several times in ONE vessel, each time in liquor of a different strength, ultimately passing through CLEAN WATER.
Produces liquor of any required strength by once passing through.
Can be fixed (if desired) at any elevation to permit Contractors' tanks being filled without the expense of pumping.

One of these Scrubber-Washers has been in successful operation for the past twelve months at the Sowerby Bridge Gas-Works, and they are now being erected at the Corporation Gas-Works, Adderley Street, Birmingham, and at the Phœnix Gas-Works, Vauxhall, London.

Prices and full Particulars on application to

TANGYE BROTHERS AND HOLMAN,

Sole Manufacturers,

LAURENCE POUNTNEY LANE, LONDON, E.C.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

LONDON, E.C.

TO GAS ENGINEERS AND MANAGERS.

It having come to our knowledge that a report is in circulation, spread by some unprincipled person or persons, that the cases of our larger-sized Meters are made of Galvanized Iron, we think it only fair to ourselves, and just to our customers, to say, that we never have used, in making any of our Meters, a single pound of *Galvanized Iron*, or any other *cheap* and *inferior material*, and this can be easily seen by opening any of them.

The cases of our large-sized Meters, from 20 lights and upwards, are all made of the very *Best Best Patent Alloy*, which is nearly double the price, and will last more than double the time, of some other material that has been and still is very largely used for the same purpose. And our experience, acquired by an extensive use of it for upwards of 30 years, enables us to say with confidence that no other metal in use for the purpose is so little liable to corrosion from the action of the gas.

We have now in use a Meter made in 1848, and therefore 29 years old, the case of which is made of Patent Alloy; the Meter is still in perfect order, and shows no signs of decay.

The utmost care is exercised by us in selecting none but the very best materials for all parts of our Meters; much of it is made *expressly for us*, as it is not possible to obtain it in the open market of the same superior quality.

The great fall in the price of all materials used in making our Meters has enabled us to give an increased discount, thus giving our customers the benefit of the fall. This we were bound in fairness to do, as we raised the price of our Meters four years ago, when the price of all metals went up.

It will be our constant endeavour, by using none but the best materials, and employing the most skilful workmen, to maintain the high character our Meter has hitherto borne.

WILLIAM PARKINSON & CO.,

(SUCCESSORS TO SAMUEL CROSLEY,)

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

MANUFACTURERS OF PATENT

WET & DRY GAS-METERS,

STATION-METERS WITH PLANED JOINTS,

GOVERNORS, PRESSURE REGISTERS, GAUGES,

AND EXPERIMENTAL APPARATUS,

STREET-LAMP METERS,

AND REGULATORS FOR AVERAGE METER INDICATION.

METERS FOR MEASURING WATER.

CONTENTS.

	PAGE
Circular to Gas Companies:—	
The Corporation Gas Purchase Bills	261
A Possible "Rate in Aid" at Ramsgate	261
Proposed Gas Regulations at Leeds	261
Exhibition of Gas Apparatus at South Shields	262
Cheap Burners at Wigan	262
The Proper Application of Gas Profits	262
Indignation at Guisborough	262
Address of the President of the Southern Association of Gas Managers	262
The Expenses of the Chief Gas Examiner and Official Auditor	262
Appointment of Examiners for the Commercial Gas Company's District	262
Water and Sanitary Notes:—	
Water Supply of Richmond	262
A New Water Supply for Manchester	262
Leading Articles:—	
Gas Bills for 1877	263
A Treatise on the Science and Practice of the Manufacture and Distribution of Coal Gas	264
Correspondence:—	
Wet and Dry Gas-Meters	265
Quantity of Brickwork in Retort-Settings	265
Street-Lamp Lighting	266
Manchester District Association of Gas Engineers	266
Parliamentary Intelligence:—	
Progress of Bills in House of Lords	266
Progress of Bills in House of Commons	266
Legal Intelligence:	
Supreme Court of Judicature—Court of Appeal—Sugg *v.* Silber	266
Greenwich Police Court—Breach of Contract of Service by Gas Stokers	268
Wolverhampton Police Court—Refusal to Supply Gas for Non-Payment of Rent	268
Norwich Police Court—Conviction for Fraudulently Disconnecting a Meter	268
Warrington Police Court—A Gas Stoker sent to Prison	269
Leeds Police Court—Illegal Use of Corporation Water	269
Aberdeen Police Court—Conviction for Stealing Gas	269
Miscellaneous News:—	
Brecon Gas Company	264
Accident to a Gasholder-Tank at Middlesbrough	264
Quality of the Bristol Gas	264
Metropolis Gas Supply	269
Metropolis Water Supply	269
Southern District Association of Gas Engineers and Managers	270
Aldershot Gas and Water Company	271
Meeting of the Kidderminster Gas Company	272
Meeting of the Bromsgrove Gas Consumers Company	272
Wigan Corporation Gas Supply	273
Macclesfield Corporation Gas-Works	273
West Bromwich Gas Supply	274
Chatham and Rochester Gas Company	274
Halifax Corporation Gas-Works	275
The Sewage Question	275
Partick, Hillhead, and Maryhill Gas Company	275
Trade Reports	276
Whitby Water-Works Company	276
Reduction in the Price of Gas	276
Glasgow Water Supply	276
Birmingham Water Supply	276
Basingstoke Water-Works Company, Limited	276
Melton Mowbray Gas Company	276
Hull Gas Supply	276
Waste of Water at Warwick	276
Bodmin Gas Consumers Company	276
Leicester Gas Company	276
Halifax Water Supply	276
Batley Corporation Water-Works	277
Eastbourne Gas Company	277
Bristol New Water-Works Company	277
Register of New Patents:—	
Applications for Letters Patent	277
Patents which have passed the Great Seal	277

TO CORRESPONDENTS.

R. B., Leeds.—*A bright red-hot poker, the temperature of which is the same as that of a flame, will ignite gas.*

E. S. CATHELS, Montreal.—*Your letter received and in type, but must stand over till next week.*

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, FEBRUARY 20, 1877.

Circular to Gas Companies.

THE list of Bills, which we print in another column, shows that, in all probability eight more gas undertakings will soon pass into the hands of Local Authorities. We mention eight only, because we cannot believe that Parliament will sanction the confiscation of the Isle of Thanet Company. The Bill of the Ramsgate Local Board is the only one in the list which proposes to make a downright compulsory purchase. There are other cases, it will be seen, in which no arrangement has yet been come to between the Companies and the Authorities who desire to buy; but we think we are right in stating that, in no instance but that of Ramsgate will serious opposition be offered to the design of the Authority. In five out of the eight cases an amicable understanding has been arrived at, and Parliament is simply asked to sanction the agreement entered into by the respective parties. Thus the Burslem, Dukinfield, Hanley, Longton, and Warrington Bills will probably pass unchallenged, and so many undertakings will cease to have a commercial character. A little qualification must be made, since we notice that most of the authorities appear to be anxious to get something out of gas consumers to be applied in aid of rates. We shall not stop now to argue this question over again; it will be sufficient to put the consumers on their guard as respects high prices, and to tell them that a town-hall might, with just as much right and reason, be built with funds derived from an excessive police-rate as with gas profits.

As regards the price to be paid for undertakings in connexion with which the terms of purchase have been settled, we are bound to say that, on the whole, they must command satisfaction. They are, as will be seen, those which have invariably been sanctioned by Parliament, and which may be said to be the fixed statutory value. Annuities equal to maximum dividends redeemable at twenty-five years purchase, or the equivalent in a gross sum, is the recognized price of a gas undertaking against the management of which nothing serious can be alleged. In the case of an exceptionally valuable undertaking, like that at Warrington, a bonus is very properly added, which, we think, should have been double the amount agreed upon. Taken altogether, however, we are not dissatisfied with the terms when arranged, and we are not afraid to trust the results of arbitration in cases where no terms have been agreed upon. Admitted principles form the basis of all arbitrations, and, as we have said, the value of a gas undertaking in fair working order is easily settled.

It is beyond our purpose, just now, to discuss at any length the question whether the several districts will be any better off under the Authorities than they have been under the Companies. In no case do the Authority propose to supply better gas, and, so far as we can see, in no case do they intend to reduce the price. Things will go on exactly as before, except that the bills will have to be paid to another party.

We observe that, in some cases, a more extended period is proposed, in the course of which borrowed money is to be paid off by means of a sinking-fund. Eighty years—which means practically eighty-five—are asked for in some instances; but probably the Local Government Board will suggest an alteration and abridgment.

When referring, some weeks ago, to the Bills of the Ramsgate Local Board and the Isle of Thanet Gas Company, we mentioned that the Board proposed a maximum price of sixpence per 1000 feet lower than that proposed by the Company. We did not, however, mention at the time, that the Board seek power to levy a gas-rate in case the revenue of the undertaking (supposing they get possession of it) should not, with gas at what is, by a figure of speech, called the *maximum* price, be sufficient to meet all the charges on the undertaking. Perhaps the Ramsgate ratepayer has not sufficiently considered this matter. If the Gas Company cannot make their profits with gas at the maximum price, they must go without them, put up with the loss, or seek some such legislative relief as was afforded by the temporary Act of 1873. But the power to levy a rate to make up a deficiency of gas revenue, which would fall alike on consumers and non-consumers, we regard as highly objectionable. Putting, for the moment, the charge for public lights out of the question, it is clear that any deficiency should be made good by increasing the price of gas. We are sorry to see that no English local authority have proposed to manage their gas undertakings on the plan common, though not universal, in Scotland, where the price is fixed by an annual estimate, a loss being made good by an extra charge in the following year, and a surplus going towards a reduction of prices. The Ramsgate ratepayer may have no immediate reason to fear a gas-rate, but we cannot help thinking that the power to levy one would be a dangerous gift to the Local Board.

Our readers will remember that we have for many years contended that the gas suppliers should have legal power to follow the gas from the main to the point of combustion; or, in other words, to exercise some control over internal fittings. Many have expressed an agreement with our opinion, but until now no definite plan has been proposed to carry out our idea. It will be seen, however, in another column, that the Corporation of Leeds insert, in a schedule to the Improvement Bill they are now promoting, a series of regulations, which, if sanctioned by Parliament, will confer many of the powers which we deem it advisable that gas suppliers should possess. So far as our memory serves us, this is the first instance in which a Corporation have claimed to exercise such powers. No Gas Company, we are certain, have ever applied for similar rights. We congratulate the Corporation of Leeds on having set a precedent which, we have little doubt, will in time be extensively followed. We will, for the present, leave these regulations for the consideration of our readers, candidly stating that they hardly go far enough to satisfy us. Something, however, must be left to the taste, or want of taste, of the individual consumer, and the design of the fitter. It is mortifying to see people put up what they consider tasteful fittings, which cut off seventy-five per cent. of the light the gas gives, and then hear them complain that the gas gives no light; but such vagaries cannot be interfered with. On all essential points the regulations are very explicit. An outcry will, no doubt, be made against giving a gas manager so much control as

the first of the regulations will confer; but we believe that it would presently be found that the manager advised rather than compelled, and his advice would be earnestly sought after. We cannot think that the conditions of things recently described by Mr. Woodall as obtaining on the premises of many consumers in Leeds, could result from anything but the grossest ignorance; but, in any case, it is time they were put an end to, and, as already said, the Corporation of Leeds and their gas manager deserve credit for making an attempt to protect gas consumers from the consequences of their own folly, and the stupidity of the ordinary gas-fitter. We hope that when the Bill comes before a Committee of either House of Parliament, these regulations will be adopted in their entirety, and that they will thereafter be carried out with the exercise of a wise discretion.

We recommended, last week, that the Corporation of Leeds should open an exhibition of good and bad burners, in a shop in Briggate, and we have many times suggested that Gas Companies in this country might imitate, with advantage, the Paris Gas Company, and make a display of apparatus used in the consumption of gas for economic purposes. Except at one of those abortive exhibitions at South Kensington two or three years ago, we do not remember to have seen any considerable collection of gas cooking stoves, and apparatuses used for the distribution of heat produced by the combustion of gas. In our advertisement columns, to-day, however, will be seen an announcement that the South Shields Gas Company have projected an exhibition, for which we desire the most complete success. We must refer our readers to the advertisement itself for full details of the scheme of the Directors, but we could not allow the opportunity to pass without congratulating the Company on their enterprise, and expressing a hope that inventors and manufacturers will liberally assist in making the exhibition the success it deserves to be. We notice one omission. The Paris Gas Company make a profit—not large, it is true—by letting on hire and selling iron stoves specially adapted for the consumption of coke. It is not, however, a matter of much importance in the North. Coal is cheap for the million, and, in good and prosperous times, coke commands a ready sale for manufacturing purposes in South Shields. But we in the south should be glad to see the consumption of coke more general, and the introduction of a good stove for the purpose would assist in promoting the object.

The Corporation of Wigan have not opened an exhibition, but something like a shop. They have laid in a large stock of what they call "Sugg's Patent Burners"—bat's-wings or fish-tails, of course—which they advertise for sale at one penny each, and the Gas Committee strongly recommend their use by all consumers. The Committee have taken a step in the right direction. Leeds might follow suit with advantage, and induce the consumers to replace the "rusty iron burners" now commonly in use with good steatite jets.

The question as to the proper application of gas profits has come up again in Birmingham, and we find one of the Corporation auditors contending, in a very able letter, that surplus profits belong to the consumer, who is, as we maintain, subjected to additional taxation when these profits are devoted to public purposes. This fact is brought out strongly when the statement is made, that in the borough of Birmingham "only "half the householders are consumers of gas, and that only "about one-third of the ratepayers may be said to be profit-"paying consumers." If this statement be true—and we cannot suppose that Mr. Beard speaks without an accurate knowledge of the facts—the policy for the Gas Committee to pursue is evident enough. Cheapen gas to the lowest possible limit, and so promote a more general consumption. When every ratepayer is a consumer, it does not matter how gas profits are appropriated.

That a small Local Board should be irate when a Government Department do not fall in with their wishes, and adopt their suggestions, is but natural. The Guisborough Gas Company have applied for a Provisional Order, authorizing them to raise further capital, and the Local Board presented a memorial against the granting of it. It would appear that the Local Board are anxious to get possession of the undertaking, and that they want to acquire it at cost price. With this object, the Local Board asked the Board of Trade to insert a clause in the Order, empowering them to make a compulsory purchase. This, of course, the Board of Trade have no power to do, and plainly say so. Whereupon the Local Board consider themselves unfairly treated, and resolve to ask the Board of Trade to reconsider the matter. The grievance of the local authority lies, as we have said, in the fact that the Company will not sell their undertaking for the money they have laid out on it, but want, like sensible men, nearly double the prime cost, which the Board will pay if they ever get the works.

The neat address of Mr. Wood, of Hastings, the President of the Southern Association of Gas Managers, printed in another column, deserves a word of notice. Mr. Wood enjoys a deservedly high reputation in the gas world, in which he has been active for a great number of years, and all he says is certain to command the respect of his brother managers. It is satisfactory to obtain from a man of his wide experience a denial of the assertion that the receipt of "commissions" is common among gas managers. The controversy has now ceased, and we think that gas managers have sufficiently vindicated themselves from the sweeping charge made by the "Commission Abolitionist."

The Corporation of the City of London have a "Various "Powers" Bill before Parliament, which, among other things, proposes to re-enact the substance of two clauses which were contained in the City of London Gas Act, 1868; but which, somehow or other, dropped out of The Gaslight and Coke Company's Act, 1876. The object of the clauses is to make the Gas Company liable for the salaries and expenses of the Chief Gas Examiner and Official Auditor, which, by the way, they have always paid, and would have continued to pay, and to make the Corporation and Metropolitan Board of Works responsible for the payment of the Examiners they appoint, and the costs they incur in the execution of their duties—a responsibility which we do not suppose they desire to shirk.

The Metropolitan Board, at their last meeting, appointed one Examiner to test the gas at the two stations of the Commercial Company. It seems to be the opinion of the Board that some further legislation, relating to the place at which the gas is tested, will be necessary when mains from many manufacturing stations communicate with each other. All that is required, as we have said before, is to test the gas at the station where it is made, and before it can possibly become mixed with that from any other source.

Water and Sanitary Notes.

THE condition of the water supply of Richmond (Surrey) cannot be said to improve; on the contrary, perhaps it gets worse. The supply is of the scantiest, and the quality of the water must be regarded as of a doubtful nature. Some of the sources from which water is now drawn are undoubtedly polluted, and since neither subsiding-tanks nor filtering-beds are in operation, it is not surprising that some of the water distributed is described as in colour like that of the "Yellow Sea." And, unfortunately, it is not probable that this state of things will soon be remedied. The difficulties of the Vestry are, we believe, only beginning. It must be many months before the machinery of distribution can be got into order, and then will come the still more important matter of finding water to distribute. It is reported that one day last week an energetic workman succeeded in removing some obstruction in the bore of the artesian well, and incontinently drowned two pumps by the rush of water which rewarded his efforts. The inhabitants of Richmond have not yet been benefited by the man's exertions, for there has been nothing to pump the water with; and we suspect that when a powerful pump has been fixed—as may be the case in a few months time—the well will soon be pumped dry again. This well, the principal source of the supply of good water relied upon, will not, we fear, last. It has, we believe, failed before, and may fail again, and what then will be the condition of things in Richmond? It looks to us highly probable that, before very many weeks are over, the inhabitants will find it absolutely necessary to have recourse once more to the Southwark and Vauxhall Company, and we hope the Company will deal liberally with them. All necessary connexions can be made in the course of twelve hours, and then Richmond will be itself again. The present state of things cannot be much longer endured, and we do hope that the Vestry and the Company, both confessing past errors, may come to an amicable arrangement which will relieve the town of its present distress.

There would seem now to be a probability that the Corporation of Manchester will soon come forward with a grand scheme for obtaining a large additional supply of water. The Woodhead gathering-grounds are now barely sufficient to supply the water required for Manchester. As our readers know, a scheme was proposed for bringing a supply for both Liverpool and Manchester from Windermere Lake. The combined scheme, we believe, was never seriously entertained by either Liverpool or Manchester, although there was much to be said in favour of it. However, the recent decision of the Liverpool Town Council to further test the well system before they decided on a large scheme, makes it necessary that Manchester should act alone; and, accordingly, we find the Water Committee of the Corporation of the latter city engaged in the considera-

tion of a scheme devised by Messrs. Bateman and Hill for bringing the water of Thirlmere Lake to Manchester. This is the nearest of the Cumberland lakes, but still it is one hundred miles distant, and, to convey the water, an aqueduct of that length will be required. The lake is sufficiently high for the water to travel by natural gravitation, and the aqueduct will be entirely underground, valleys being crossed by syphons. It is proposed, as before, that towns lying along the route of the aqueduct shall be supplied, and thus the expense to Manchester lessened. We have not, as yet, seen any estimate of the cost of the works, &c., but it will necessarily be of an enormous amount. The Corporation of Manchester, however, are not stopped by trifles, and we confidently expect that this scheme will be carried out. Its importance will necessitate a further notice when we obtain fuller details.

GAS BILLS FOR 1877.

(*Continued from page* 228.)

The next group of Bills we notice consists of those promoted by Local Authorities to obtain power to acquire gas undertakings.

The *Ashton-under-Lyne Improvement Bill* is, among other things, to enable the Corporation of Ashton to purchase the undertaking of the Ashton Gas Company. If the measure should pass, the Corporation will have power to acquire the undertaking at any time within seven years, on giving notice to the Company. The consideration may be a gross sum or annuities, the amount being settled by agreement or arbitration. The Corporation propose to supply fourteen-candle gas, tested by Sugg's "London" Argand; and the maximum price, we may take it, is to be that now chargeable by the Company. With reference to the gas purchase, the Corporation seek power to borrow as much money as may be required to effect it.

The *Blackburn Borough Gas, Water, and Extension Bill* is (*inter alia*) to give the Corporation power to acquire the undertaking of the Blackburn Gaslight Company at any time after the passing of the Act, on giving due notice. The terms are to be settled by agreement, or by arbitration under the Railway Clauses Act, 1845. The Corporation propose to supply sixteen-candle gas, tested by the "London" Argand, No. 1. The maximum price will be that sanctioned by the Company's Act. The consideration may, as usual, be a sum in gross or annuities. If the latter, the Corporation seek power to redeem them at twenty-five years purchase. As in the previously-mentioned case, power is sought to borrow as much money as may be required to effect the purchase, or as may be wanted, from time to time, to redeem annuities.

The *Burslem Local Board Bill* was noticed before. It is to enable the Board to acquire the undertaking of the Burslem and Tunstall Gas Company for the sum of £86,000. The Board propose to supply fourteen-candle gas, at a price not to exceed 5s. per 1000 feet. They may appoint a Gas Examiner, who will report to the Gas Committee once a week. Power is sought to borrow the purchase-money—£86,000—and a further sum of £20,000, as it may be required, for the purposes of the Act. Net profits may be applied in forming and maintaining a reserve-fund, which is never to exceed £1000. Any surplus, and also the interest on the invested fund, is to be carried to the district-fund.

The *Dukinfield and Denton Local Boards of Health Bill* is to enable the two Boards jointly to acquire the undertaking of the Dukinfield Gas Company. The consideration is to be perpetual annuities of ten per cent., which may be redeemed at twenty-five years purchase. The undertaking is to be managed by a joint committee of the two Boards specified, with power to take in the Sanitary Authority of Haughton. The Bill proposes a supply of fifteen-candle gas, tested by an Argand or other approved burner, at a price not to exceed 5s. per 1000 feet.

The *Hanley Corporation Gas Bill* is to enable the Corporation to acquire the Etruria works of the British Gaslight Company, who supply gas to the borough of Hanley, and the parishes of Wolstanton and Bolton-in-the-Moors. The consideration is to be the payment, in perpetuity, of the annual sum of £5382, which is, in round numbers, ten per cent. on the capital invested in the undertaking. The Corporation, however, seek power, at their option, to issue annuities to individual shareholders. In either case, the annuity or annuities may be redeemed at twenty-five years purchase. The Corporation propose to supply fourteen-candle gas, at a price not to exceed 3s. 6d. per 1000 feet. As regards the application of profits, it is provided that a reserve-fund may be formed and maintained, not to exceed £2000, and that when gas is sold for 3s., or less, the Corporation may apply surplus profits to improvement and other public purposes. The gas districts in the Potteries are a good deal mixed up, and this Bill will give the Corporation power to sell to the Local Board of Tunstall so much of the Hanley undertaking as lies within the limits of the Board. The Corporation seek power to borrow such sums of money as they may require, the aggregate amount not to exceed £150,000.

The *Longton Corporation Gas Bill* is to authorize the transfer of the undertaking of the Longton Gas Company to the Corporation. The consideration is to be the payment of the sum of £75,150 in cash. Power is sought to borrow £100,000 for the purposes of the Act. The Company's Act, 1875, will apply to the Corporation, so the quality of the gas and the maximum price chargeable will remain the same.

The *Newcastle-under-Lyme Borough Extension and Improvement Bill* is, among other things, to enable the Corporation to acquire within seven years the undertaking of the Newcastle-under-Lyme Gaslight Company. No arrangement seems to have been entered into, so the terms of purchase will be settled by agreement or arbitration. They may, of course, be the payment of a sum in gross, or the issue of annuities to represent shares. If by the latter, the Corporation seek power to redeem them on agreement or by arbitration. Authority is sought to borrow as much money as the Corporation may require for the purchase. The Corporation propose to supply fourteen-candle gas, and as the Company's Act will continue to apply, the maximum price will remain the same.

The *Ramsgate Local Board Bill* has been noticed more than once in our "Circular." Its object is, among other things, to effect a compulsory purchase of the Isle of Thanet Gas Company. The Board, if they succeed, will supply fourteen-candle gas at a price not to exceed 5s. per 1000 feet.

The *Warrington Corporation Gas Bill* has also been repeatedly noticed. Its object is to obtain the sanction of Parliament for the purchase of the undertaking of the Warrington Gas Company on terms which our readers know have been already arranged. The consideration is to be annuities equal to maximum dividends on all the paid-up capital with a bonus of ten shillings per share. The Corporation are to pay the income-tax on the annuities, and to assume all the debts of the Company. Annuities may be redeemed at the usual rate—twenty-five years purchase. The Corporation propose to supply sixteen-candle gas at a price not to exceed, within the borough, 4s. per 1000 feet. Beyond the limits of the borough sixpence additional per 1000 will be charged for every mile of distance, provided, however, that consumers without the borough of not less than 250,000 feet in the half year are to be charged the same price as consumers within the borough. Liberal discounts, according to the quantity of gas consumed, are to be allowed for prompt payment. As regards the application of profits, it is provided that after defraying all charges, the Corporation shall form and maintain a reserve-fund, not to exceed £10,000, and then any surplus, together with the interest on the invested reserve, is to be carried to the Borough Improvement Fund. The Corporation seek power to borrow, for the purposes of the Act, £200,000, with a limitation which need not be mentioned.

The following Bills are promoted by authorities already possessing gas undertakings, with various objects irrespective of gas concerns, but are here only noticed so far as they relate to gas matters.

The *Bolton Improvement Bill* is, among other things, to authorize the Corporation to raise £100,000 for gas purposes.

The *Dundee Gas Bill* is to empower the Dundee Gas Commissioners to borrow the additional sum of £100,000, and to acquire additional land for the extension of their gas-works.

The *Leeds Improvement Bill* is to enable the Corporation of Leeds to acquire additional land on which to erect manufacturing and storeage works, and also to extend the limits of gas supply. The novel course has been adopted in this case of proposing a series of regulations, in a schedule, for "the prevention of waste, misuse, and undue consumption of gas," which regulations are to take effect as if enacted in the body of the Bill. In consequence of their novelty, we print the proposed regulations at full length :—

Regulations to be observed to Prevent the Waste, Misuse, or Undue Consumption of Gas supplied by the Corporation.

1. Any person who shall refuse, neglect, or fail to obey the directions of the gas manager of the Corporation for the time being, with reference to the construction or position of all fittings, pipes, cocks, and other things in, or in connexion with, any house or building, or who shall fail to observe the regulations made by the Corporation, shall forfeit and pay a sum not exceeding *forty* shillings.

2. In cases where the regulations are not complied with, and the fittings not executed to the satisfaction of the Corporation or their manager, gas shall not be supplied, although payment may have been made in advance.

3. No person shall fix or remove any meter without the special permission of the manager, in writing, under a penalty not exceeding *five* pounds.

4. No person shall interfere with stopcocks, valves, or other matters or things belonging to the Corporation without the special permission of the manager, under a penalty not exceeding *forty* shillings.

5. Every incoming tenant must give immediate notice at the offices of the Corporation before commencing to consume gas, in default of which he

will be held liable (in addition to the penalties imposed in such cases by Act of Parliament) for all the gas that may have passed through the meter since the last inspection.

Regulations to be observed by Fitters and others.

1. All applications for supplies of gas must be made, at the offices of the Corporation, on a printed form there provided for the purpose.

2. All premises intended to be lighted must be fitted up with piping, chandeliers, brackets, pendants, &c., and all internal work must be completed, and be perfectly sound and gas-tight, or the different situation for gas fixtures effectually capped with metal caps, before the meter is fixed.

3. All service-pipes for gas from the main to the meter will be laid by the Corporation to the extent of *fifty* feet from the main free of charge, the portion beyond at the expense of the person or persons requiring it, and no person will be allowed to cut, alter, or in any way interfere with the pipe when so laid without the permission of the manager.

4. The size of the meter to be fixed in any premises will be determined in all cases by the manager, and it will be fixed by the servants of the Corporation, unless permission be otherwise given by the manager.

5. The gas-meter (unless it be necessary to use a dry one) must be placed in as low and cool a situation as the premises will admit of, and must not, on any account, be exposed to the action of the weather, especially to frost or excessive heat. If a dry meter is used, it must be placed on a shelf or other support, and in a dry situation. All meters liable to be damaged must be cased off so as to be protected from injury.

6. Gas-meters will be provided on hire, and be kept in repair by the Corporation, but the consumers will be held liable for any damage occurring to the meters through want of proper protection or from negligence.

7. In fixing the gas-piping in, or in connexion with, any premises, particular care must be taken, whenever practicable, to give it a good descent towards the meter, and in a perfect line, in order to prevent water lodging therein. Where the piping cannot be made to descend towards the meter, a small cock or metal plug must be fixed beneath the lowest part, so that any water which may accumulate may be drawn off.

8. No self-acting syphons or bent tubes, open at the ends, shall in any case be attached to the gas-piping for the discharge of water.

9. The pipe leading from the meter to the light will be connected to the outlet of the meter by means of an union joint, and, except as hereinafter provided, must correspond in bore with the outlet of the meter as far as the first branch, where in most cases it may be diminished to the next size of piping. In cottages or other tenements where not more than *three* burners will be fixed, the pipe leading from the meter may be diminished in bore to the next size, at a distance of *three* feet from the outlet; in which case, however, there must be no further diminishing except to the last burner.

10. In order that the gas-fitter may know, before any premises are fitted up, what sized gas-meter will be fixed, and consequently the size of piping necessary, he must make application to the manager, on a printed form provided for the purpose, stating the probable number of lights that will be required.

11. The lead or block tin piping used for gas-fitting must not be less than the following weights and sizes:—

Lead Pipes.

	lbs.	oz.	
1-inch bore to weigh	2	0	per foot.
¾ " "	1	4	"
½ " "	1	1	"
⅜ " "	0	14	"
¼ " "	0	7½	"

Composition Pipes.

½-inch bore to weigh	0	6	per foot.
¼ " "	0	4	"

The Corporation seek power to borrow £300,000 for gas purposes, and desire permission to form out of surplus profits a depreciation or reserve fund, to the amount of which no limit is proposed.

The *Middlesborough Corporation Bill* is to empower the Corporation to acquire land and erect additional gas storeage works, and to borrow the further sum of £80,000 for gas purposes.

Brecon Gas Company.—The annual meeting was held on the 6th inst., when a dividend at the rate of 10 per cent. on the old, and 9 per cent. on the new shares was declared. A larger balance than usual, it was stated, would be kept in hand. On the motion of Mr. W. J. Roberts, seconded by Mr. F. Watkins, £100 was voted to the board of directors for their services during the past year. Some conversation ensued as to the quality of the gas, and it was stated that, considering the population and other circumstances, gas was as cheap in Brecon, and much superior in quality to that of Hereford, Swansea, Newport, &c. The usual vote of thanks to the chairman terminated the business.

Accident to a Gasholder-Tank at Middlesbrough.—The *Northern Echo* of Saturday last contains the following paragraph:—"Considerable alarm has been felt by the leading men of the Middlesbrough Corporation respecting the shrinking of the gasholder-tank in the course of construction on the Marshes. Some time ago a site was purchased situate in the Marshes, with Snowdon Road on one side, the branch of the railway on the other side, Washington Street in close proximity, and Randolph Street and two or three other streets being situate on the same side as Hopkins, Gilkes, and Co.'s works. The selection of the site caused some warm discussion in the Middlesbrough Town Council, the site being strongly advocated by Mr. John Dunning. The chairman of the Gas Committee, Mr. Dunning, believed the site to be the most suitable that could be found in the borough for the erection of a gasholder-tank, and the one that was being erected would, when completed, be perhaps the largest in the North of England, and was to cost about £30,000. Operations were commenced in the latter part of 1875 or the early part of 1876, and the excavation was rapidly proceeded with. It was decided to build a wall round the tank, of concrete, gravel, and cement—six feet wide. The wall had been carried up to a great height, and the work was believed to be progressing favourably, but on Thursday morning the wall on the side of Washington Street gave way, and nearly half of Washington Street sank down into the portion that had been excavated for the tank. Fears were at first entertained for the cottages on the opposite side of the street. Several of them have shrunk, but it is expected that they will not go any further now. The place yesterday presented a deplorable appearance, nearly half of the wall having given way. The Gas Committee on Thursday telegraphed to Newcastle for Mr. Cail to come over to Middlesbrough and meet the committee. At noon, yesterday, the committee held a special meeting, when Mr. Cail was in attendance, and was instructed to inspect the tank. It is estimated that the giving way of the wall will entail a loss of £6000 or £7000. It is said the foundations are faulty, and doubt is expressed as to the construction of the wall."

A TREATISE ON THE SCIENCE AND PRACTICE OF THE MANUFACTURE AND DISTRIBUTION OF COAL GAS.

CXXIX.

Main-Laying.

In the laying of mains, certain mechanical appliances are necessary, in addition to the manual labour employed. The apparatus denominated a three-legs, or shear-legs, is frequently adopted for raising and lowering pipes above 8 inches in diameter. This, stretching across the open trench, is shown in the fig. 48.

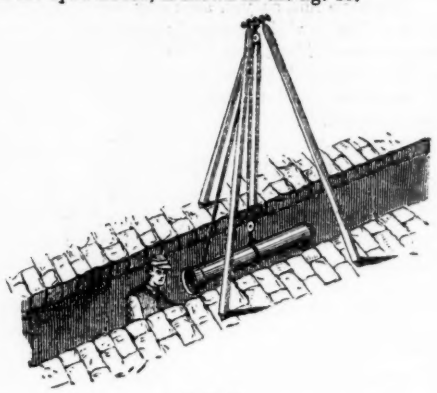

Fig. 48.

It consists of three wooden poles, usually of ash, from its toughness, 10 or 12 feet long each, tapering from one end to the other, and averaging about 5 inches thick. These are hooped with iron at both ends, and a wrought-iron spike, being driven in at one of the ends, is made to project about 3 inches, in order to penetrate the ground, and prevent the slipping of the legs when fixed over the trench. The other three extremities of the poles are all secured together by means of a wrought-iron pin or bolt, having a head at one end and a cotter at the other. This passes loosely through the three ends, allowing the poles to swivel across the trench, two at one side and one opposite. From the pin an iron link depends, and from this again is suspended the blocks and chain for raising and lowering the pipes in course of being laid. Another modification of the apparatus is to have the wooden framework rigid, and in form resembling a trestle, as in fig. 49. To this is usually attached a winch, turned by a handle, for greater ease in manipulating large pipes.

The late Mr. Rafferty, of Manchester, some years ago, designed a very useful machine for main-laying. Two sizes of this are employed by the Corporation gas authorities in that city. One is intended for pipes from 10 inches to 16 inches, and the other for pipes from 18 inches to 40 inches diameter. Their form and construction are shown in the accompanying engravings. The drawings are copied from a photograph taken as a 30-inch main was being laid. The machine is made to move on rails, laid about 6 feet apart, on each side of the trench. Fig. 50 shows the apparatus and the men engaged, the pipe-layer, or foreman, standing at the spigot end directing his assistants. A, the eccentric blocks; B, winch for raising or lowering the pipe; C, wheel and pinion for moving the machine; D, the yoke-rings to enable it to be drawn from one place to another; E, scotch to hold the machine fast at any desired point; F, ring for common blocks; G, the hook from which the tup for driving the pipe is suspended by a block and chain, and fig. 51 the workman in the position of driving the pipe home. The latter drawing is intended merely to show the method of driving. Of course, in practice, the pipe is first lowered to the bottom of the trench or cutting, and the men take their places there also. The pipes are rolled on to a cross-plank clipped by a rope or chain, and then attached to the eccentric blocks to be taken to the part of the trench required. Five or six men can roll a pipe 20 inches in diameter, lay it in its proper place in the trench, and complete the joint, if turned and bored, in the short space of from six to eight minutes. With the use of this machine, mains of large size may be laid with half the number of men required to be employed when using the ordinary implements, and with more satisfactory results. We are fully convinced of the excellence of the arrangement, and recommend it to the attention of gas managers about to put down mains of large diameter. The maker of the machine is Mr. John Storey, of Manchester.

(To be continued.)

Quality of the Bristol Gas.—At the meeting of the Bristol Town Council, on the 13th inst., Mr. B. Kitt, Gas Examiner under the Sanitary Authority, reported that during the past quarter he had submitted the gas to very careful examination, with a view of detecting two of the common impurities of coal gas—namely, sulphuretted hydrogen and ammonia, but had found it free from both of these deleterious compounds. The specific gravity had ranged between 539 and 526, the average being 533. The pressure at which the gas was supplied to the public had much improved, and on no occasion during the past quarter was it below the standard. The number of the public lamps to Dec. 30 last amounted to 3996, and were situate as follows:—1486 in the City; 711, Clifton; 690, St. Philip's; 465, Redminster; 349, District; and 295, Westbury. Twenty-seven new lamps had been erected during the quarter. The number of gas-meters examined and tested under the Sales of Gas Act had been 135, 38 of which were stamped as correct, and 47 denounced as incorrect came into operation. The total number tested since the Act to Dec. 30 last amounted to 10,643.

MAIN-LAYING APPARATUS (*for Description, see opposite page*).

FIG. 49.

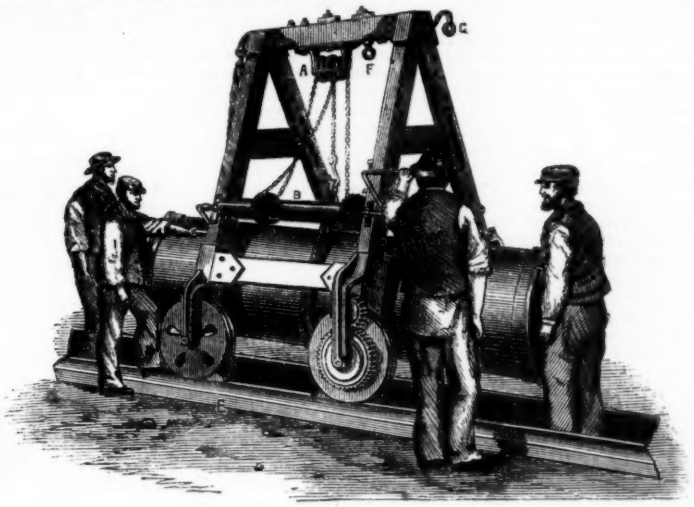

FIG. 50.

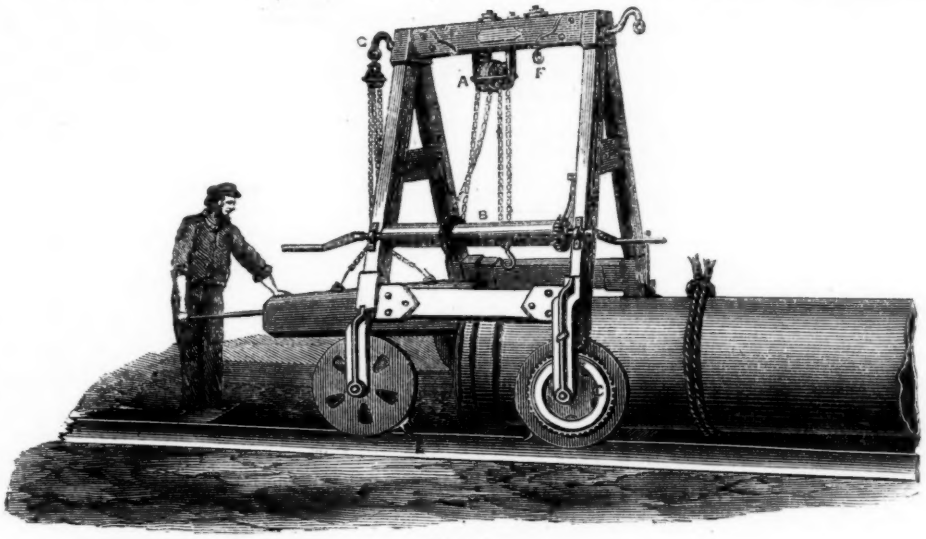

FIG. 51.

Correspondence.

WET AND DRY GAS-METERS.

SIR,—As an advocate of that beautiful but often ill-used, and, for trade purposes, vilified instrument—the wet gas-meter—I was much gratified to read the report of Mr. Warner's lecture in your issue of the 30th ult. Having had a somewhat long experience of its duties, I can indorse all Mr. Warner has stated with reference to it, and have long held the opinion that the wet meter would ultimately stand alone; for it possesses qualities which must ensure its adoption, at all events by those engineers who will give the subject their own personal attention. My long experience of dry meters compels me to admit that Mr. Warner has given them more than their due, and I quite agree with him when he says we should insist upon absolute accuracy of registration, seeing that this has now been attained. Dry-meter advocates say that, with constant supervision and testing, they can get satisfactory results from their use; but I maintain that a dry meter may be correct to-day and not to-morrow, and I will give one instance out of many such which have come under my notice.

About three months ago I tested a 20-light meter and found it correct, even when passing only one light; but to-day I have tested it again, and find that, at full speed, it is 3·43 per cent. slow, and at 30 feet per hour it is 28 per cent. slow. This meter was fixed at a shop with private house attached, and during business hours would probably be working up to its full capacity, when there would not be much the matter; but after closing time, when only 6 lights were going, it was registering 28 per cent. slow, and when only 2 or 3 lights were burning, would not register at all. Advocates of the dry meter will say you will find other meters registering fast, thus robbing Peter to pay Paul. The latter may be satisfied; but what will Peter say? There are other evils arising out of this state of things, besides the constant annoyance which suspicion of the instrument gives. These go to create a bad feeling with the public against the company (and this is bad enough already), and are, I believe, often the cause of complaints that terminate in competition and opposition. So long as a meter will work correctly, all may go on well; but as soon as you suspect it is going wrong, and wish to have it tested, there comes a suspicion that, because it is the consumer's property, you are not doing him justice. Therefore I say, if we can have absolute accuracy of registration without all these annoyances and bad feelings, which are so inimical to the interests of those concerned, by all means let us have it. The public have a right to demand accuracy, combined with good management; but I know many consumers prefer the dry meter, because they think it will register in their favour; but if told a wet meter is a better investment, they are very incredulous. As I am writing, perhaps you will allow me to say that companies ought to be very careful to see that those officers who come into contact with their consumers are well up in their business, kind and courteous in their manners, and anxious to give the consumer all the information he requires, the Sales of Gas Act notwithstanding.

In conclusion, I would say that, although I have an interest in two meters that bear my name, I should be pleased to advocate the dry meter if its present defects could be removed.

19, *Oxford Street, Leicester, Feb.* 5, 1877. G. GOLDSMITH.

QUANTITY OF BRICKWORK IN RETORT-SETTINGS.

SIR,—I do not think that the arguments in my letter on retort-settings, written over two years ago, and until now unanswered, are in anywise shaken by the criticisms of your correspondent, "C. T. S."

To avoid false issues, let me state distinctly that I do not advocate any excess of brickwork in a setting; but I object, as strongly as ever, to the policy of those who would minimize its amount to the utmost extent possible. My letter was written to combat some very extreme theories that had been broached on this head. A happy medium, as your correspondent, "S. N. A. P.," puts it, may be attained if sought for. Let us descend to particulars. Vague, general statements are often misleading, and seldom instructive. Clay retorts are best from 2½ to 3 inches in thickness, according as they are made by machine or by hand, and the chief point to be observed, in setting them, is to let the heat have free scope for circulating throughout the oven. With this object in mind, there should be none of that mistaken contraction of the nostrils leading out of the furnace; it is here where the evil in some settings exists, obstructing the passage of the heat as it is generated, and hastening the premature destruction of the furnace bag. Clay retorts, 8 feet 6 inches long, are adequately supported by four transverse supports, in addition to the back ledge and the front wall, and only one of these four need be 9 inches thick. With a setting of this description, having ample space for the exit of the heat from the furnace into the oven, and through the flues, the best results, both as regards heating and economy of fuel, hitherto achieved, are obtained.

It has been stated that the perfection of a retort would be one made of thin platinum, which would offer only the smallest possible obstruction

to the conduction of heat to the coal undergoing carbonization. Under the present system of firing a bench of retorts, I have grave doubts about the correctness of this view.

It is safe to dogmatize on the point, however, as the experiment is too costly ever to be put to the test, but one has an instinctive forecast that it would prove a failure if it were tried. The fact that fire-clay, in spite of all that was urged against it by its early opponents, has proved to be the best material for retorts, not merely on account of its refractory qualities, but also by reason of the bulk of heat (so to speak) which it supplies, is in itself sufficient proof that it is not so much perfect conduction, as a generous body of heat in the vicinity of the material undergoing distillation, that is required.

Although one cannot hope to put the platinum retort theory to the test, we can judge what the effect would be, by considering the known facts as regards iron. What are the facts in regard to the use of iron retorts, putting aside the question of their durability? Iron is a comparatively good conductor of heat, and if economy in fuel is mainly dependent on the conductibility of the substance composing the retort, it will follow, as a necessary corollary, that in the use of iron retorts there will be a distinct saving in the quantity of fuel required for carbonizing. The experiment of employing iron retorts in an open setting, without the intervention of any protecting fire-clay covering, has repeatedly been tried, but never with the resulting saving in fuel that the advocates of perfect conductibility would have us believe.

Facility in conduction, in fact, cuts two ways. There are times when the temperature within the oven is below that in the retort—after the furnace has been newly charged with coke, for example; and at such times the result, with a retort made of good conducting material, is undoubtedly the abstraction of heat from the mass of coal being distilled, and in the absence of the proximity of a body of fire-brick, the disadvantage in this respect would be more distinctly appreciable.

It is a purblind argument, in the face of actual facts, to insist on the necessity, or, at least, the desirability, of perfect conduction in the substance of a retort. The conductiblity of heated fire-clay, whatever its proportion as compared with the metals, seems to me to be just suited to the work of carbonizing, and those who are so loud in lamenting the non-conducting power of clay materials had better abate the vigour of their lamentations, as it has been proved by the results obtained in working the Ponsard gas furnace,* that the conducting power of fire-brick is much greater at high furnace heats than at ordinary temperatures.

THOS. NEWBIGGING.

5, *Norfolk Street, Manchester, Feb.* 14, 1877.

STREET-LAMP LIGHTING.

SIR,—Your correspondent, "W. M. A.," instances a case where the local board have resolved to lay a separate main-pipe for the supply of the public lamps. My object in addressing you is not to enter upon any detailed argument of the advantages or otherwise of this step, but to suggest that as they have (probably for sound reasons) resolved upon it, they should complete the arrangement by fitting the lamps with automatic lighters and regulators.

A very interesting and, so far, successful experiment is now being carried out with 20 of these lighters on the South Metropolitan district in the Old Kent and Peckham Roads, and, so far, not only as a lighter and extinguisher, but also as a regulator, the action has been satisfactory. The only doubt I myself entertain in the matter is whether the general main-pipes, supplying ordinary consumers, will be reliable in giving a constant pressure—that is, whether an increased or diminished consumption by consumers may not affect the pressure in the mains to the extent of rendering the action irregular. This doubt has not, however, been verified hitherto, as the lamps are generally lighted before, and extinguished after, the ordinary consumption is required.

A special system of mains would entirely obviate any difficulty of this kind, and I have no hesitation whatever in predicting that, with such an arrangement, automatic lamp-lighting would be perfectly successful.

I venture in this way to solicit, through your JOURNAL, a means of communicating with the local board referred to. I am not the patentee of the lighter, and have only consented to assist in the promotion of the scheme from a desire which I have long felt to further this improvement in street lighting, and will only add that any information desired may be had on application to me, or to Messrs. Borradaile and Wright, Mildmay Chambers, 82, Bishopsgate Street, E.C.

34, *St. George's Road, Southwark, Feb.* 15, 1877. A. F. WILSON.

MANCHESTER DISTRICT ASSOCIATION OF GAS ENGINEERS.

SIR,—Kindly allow me, through the medium of your JOURNAL, to say that on Feb. 1, 1877, the President of the Manchester District Association of Gas Engineers invited the committee and several other friends to visit the Stafford Gas-Works, which they did, and the remarks made by Mr. Hunter, of Salford, appertaining to the efficiency of the gas-works at Stafford were upheld by all the engineers present. The error in the first paragraph which appeared in your JOURNAL was in quoting the above as the twenty-ninth quarterly meeting of the members.

WILLIAM LONGWORTH, Hon. Sec.

Gas Offices, Dukinfield, Feb. 14, 1877.

Parliamentary Intelligence.

HOUSE OF LORDS.

MONDAY, FEB. 12, 1877.

The Lord Chancellor acquainted the House that the Standing Orders applicable to the Newport (Monmouthshire) Gas and the Bristol United Gas Bills have been complied with.

The following Bills were presented and read the first time:—Blackburn Borough Gas, Water, and Extension; Bromsgrove, Droitwich, and Redditch Water; East Worcestershire Water; North-East Worcestershire Water.

The Lowestoft Water, Gas, and Market Bill was presented, read the first time, and referred to the Examiners.

TUESDAY, FEB. 13.

The Londonderry Gas Bill was presented, read the first time, and referred to the Examiners.

FRIDAY, FEB. 16.

The East Worcestershire Water Bill was read a second time.

HOUSE OF COMMONS.

MONDAY, FEB. 12, 1877.

Mr. RAIKES reported that, in accordance with Standing Order 79, he had conferred with the Chairman of Committees of the House of Lords, for the purpose of determining in which House of Parliament the respective Private Bills should be first considered, and that they had determined that the Bills contained in the following list should originate in the House of Lords, viz:—Blackburn Borough Gas, Water, and Extension; Bromsgrove, Droitwich, and Redditch Water; Dublin Improvement Acts Amendment; East Worcestershire Water; Londonderry Gas; Lowestoft Water, Gas, and Market; North-East Worcester Water.

The London Corporation Bill was read the first time; to be read a second time.

TUESDAY, FEB. 13.

The following Bills were read the first time, and referred to the Examiners, viz.:—Carshalton Gas; Croydon Commercial Gas; The Gaslight and Coke Company; Ramsgate Water; Thanet Gas; Coatbridge Gas; West Surrey Water; Newport (Monmouthshire) Gas; Wakefield Gas; Waterford Gas; Woolwich, Plumstead, and Charlton Consumers Gas; Bristol United Gas; Alliance and Dublin Consumers Gas (Bray Supply); Colne Gas; Crystal Palace District Gas; Louth Gas; Warrington Corporation Gas; Bishop Auckland District Gas; Stretford Gas; North Cheshire Water; Southend Gas; Christchurch Gas; Epsom and Ewell Gas; Kent Water; Ashton-under-Lyne Gas; Falmouth Water; Heywood Water; Leicester Gas; Newcastle and Gateshead Water; United General Gas Company (Limerick).

The following Bills were read the first time; to be read a second time, viz.:—Newcastle-under-Lyme Borough Extension and Improvement; Wakefield Improvement; Perth Water; Tunbridge Wells Water; Sunningdale District Water; Glasgow Corporation Water; Leeds Improvement; Limerick Gas; Rotherham Corporation; Edinburgh and District Water; Dundee Gas; Sittingbourne Gas; Middlesbrough Corporation; Ashton-under-Lyne Improvement; Ramsgate Local Board; Bristol District Water; Carnforth District Water; Stamford Water; Tudhoe and Sunderland Bridge Gas; Maryport District and Harbour (Gas); Burslem Local Board; Bridgwater (Corporation) Water; Bolton Improvement; Dukinfield and Denton Local Boards of Health; Hanley Corporation Gas; Longton Corporation.

THURSDAY, FEB. 15.

Petitions against the following Bills were presented:—Leeds Improvement Bill from Middleton Estate and Colliery Company, Limited, and others; Newcastle and Gateshead Water Bill from Corporation of Gateshead; Newcastle-under-Lyme Borough Extension and Improvement Bill from (1) Stoke Fenton and Longton Gas Company, (2) Corporation of Stoke-upon-Trent, (3) ratepayers and owners in Stoke-upon-Trent.

Mr. FAWCETT gave notice that on Tuesday, the 20th inst., he would ask the President of the Local Government Board whether, if, as reported in the public journals, the local authorities of Croydon have decided to apply for permission to convert 100 acres of Mitcham Common into a sewage farm, he will promise either to refuse the application, or not to grant it until the House has had an opportunity of expressing its opinion upon the proposed conversion to such a purpose of a considerable portion of a valuable open space near the Metropolis.

Mr. ALEXANDER BROWN gave notice, deferring his motion in respect to the Water Supply of Villages and Rural Districts from Friday, the 16th, to Tuesday, the 20th inst.

SATURDAY, FEB. 17.

Petitions against the Bolton Improvement Bill were presented from (1) Astley Bridge Local Board, (2) Halliwell Local Board.

Legal Intelligence.

SUPREME COURT OF JUDICATURE—COURT OF APPEAL.

TUESDAY, FEB. 13.

(*Before Lords Justices* MELLISH, BAGGALLAY, *and Sir* W. B. BRETT.)

SUGG *v.* SILBER.

Mr. L. W. CAVE and Mr. R. E. WEBSTER appeared for the appellant (the plaintiff in the action); Mr. ASTON and Mr. HARRISON were counsel for the respondent (the defendant in the Court below).

This was an action brought by Mr. W. T. Sugg, gas engineer, of Westminster, for an infringement by the defendant of a patent taken out by the plaintiff for "improvements in gas-burners, and in the method of constructing and manufacturing the same." The case was tried before Justice Blackburn, in May last year, and reported at great length in the JOURNAL. On the trial, the jury found a verdict for the plaintiff, and the learned judge reserved a point of law as to the sufficiency of the specification. The Queen's Bench Division of the High Court of Justice, having heard arguments thereon, ruled that the specification of the plaintiff, in claiming two things, one of which was not the subject matter of a patent, was bad, and consequently that the patent was void. The Court thereupon directed judgment to be entered for the defendant, and the plaintiff now appealed against that decision. The hearing of the arguments on the appeal commenced on the 10th inst., and were continued till this day.

In delivering judgment,

Lord Justice MELLISH said: In this case the objection to the patent which was taken at the trial was upon the ground that there was a separate claim for the means of manufacturing the gas-burners, and that that separate claim was for something which was not the proper subject matter of a patent. In the first place, there appears to have been some question as to what actually passed at the trial. Now, I think it is quite clear that the learned judge at the trial assumed that it was admitted that these alleged improvements in manufacturing were not themselves new, so as to make the proper subject matter of a patent, and that the points of law which he intended to reserve were two—viz.: First, the question whether the notice of objections was sufficient; and the other, and more material one—viz., Upon the true construction of this patent, is there a separate claim for the means of manufacturing the gas-burners separate and distinct from the claim for the improved gas-burners themselves. Now, it has been argued before us that the admission at the trial was simply an admission that casting and fixing together, in the mode described here, would not be in itself new, but that it was still open for the plaintiff to contend that, although it might not be in itself new, yet that the casting and fitting together, at one operation, the principal parts—that is, the supply-tubes—might be new. Now, certainly, that view seems to me quite

* *Vide* "*Mémoires de la Société des Ingénieurs Civils*," April 16, 1875.

clearly never to have occurred to the learned judge at the trial, nor does it seem to me to have occurred to the learned judges in the Court below. It is not mentioned at all in their judgment. They considered that what was really claimed here was the casting of the particular parts in one operation. Then the first question which arises is, Is that really open? Whose business was it, looking at the way in which the case was conducted at the trial, to have called the attention of the judge to the fact that the alleged improvement, in this part of it, consists simply in the casting at one operation? In my opinion it was the business of the plaintiff's counsel. When the learned judge put the question, and said that is admitted, and proceeded to reserve these two points, if they wished to say that there was a real novelty of invention because of the supply-tubes being fixed, in one operation, to the casting—if they meant to say that this was such an invention that it might possibly be the subject matter of a patent—I think it was their business to have said it at the time, and not to have allowed the learned judge to reserve the point upon the assumption that it was admitted that, in themselves, the alleged improvements in manufacturing were not the subject matter of a patent. But, notwithstanding that, if I thought it was a real misapprehension of what took place at the trial, and if I thought there was a real case to go to the jury, from which it could be reasonably expected that the jury might find that the addition of the supply-tubes to the casting did make an alteration so novel that it might possibly be the subject matter of a patent—if I thought there was any reasonable chance of that, I should be disposed to allow, not a new trial generally, but to allow an issue to be directed to the jury to try that particular question. But I am persuaded that this is a mere ingenious invention of Mr. Cave's, made for the purpose of arguing this case before us, and that it has not been seriously alleged by anybody—that is to say, by anybody who understands the scientific part of the question. It has not been seriously alleged by anybody that the putting in of the supply-tubes, at the same time with the casting, would make such a substantial novelty that a jury would find it to be a novelty, and I think we ought not to direct an issue simply for the purpose of trying something which necessarily, as it appears to us, must be found in favour of the defendant. Therefore the case must turn, I think, upon the two points that were reserved at the trial. With reference to the first—as to the notice of objections—the authorities cited by Mr. Cave were all cases where objections had been taken to the notices of objections at the time they were delivered, and further and better particulars were asked for. In my opinion, there is a very large difference between a case where a judge has ordered further particulars to satisfy the objection more specifically, and a case at the trial where the party ought to be prevented from availing himself of an objection, of which sufficient notice had not been given. It is perfectly obvious that if Mr. Cave was right in saying that the two questions are the same, and wherever the Court would order further particulars because the objections had not been particularly specified, it would also hold that the party was precluded from raising it at the trial, nobody would be foolish enough to go and ask a judge for further particulars, because it might be said, "You cannot rely upon this objection at the trial." In my opinion, at the trial, if the words had included the objection, for instance, although they do not specifically point, when the invention consisted of several claims, to which of the particular claims it alludes, but the general objection that the invention is not the subject matter of a patent, is sufficient to open the objection that the whole or some particular part of it is not the subject matter of a patent so as to make the patent bad. Therefore I am of opinion that the notices of objections were sufficient. Then we come to what is the real question which we have to decide—What is the construction of this specification, and does it claim the means of manufacturing separate and distinct from the making of the burners, and, what is also very material, is it, upon the true construction of the claim, confined to the mode of manufacturing any specific improved burners, or does it include the mode of manufacturing burners generally, so that if anybody adopted the first part of the specification he would infringe the second? That the patentee does really intend to claim the mode of manufacturing seems to be clear beyond all question. From the very title, and the course of the specification itself, it is plain that he does; because he begins by saying, "Improvements in gas-burners and in the method of constructing and manufacturing the same." He seems clearly to have thought, even from his title, that he had not only found out an improved gas-burner, but he had found out some novel method of constructing and manufacturing the same. I admit that the term, "the same," is ambiguous, and might mean either this particular improved gas-burner, or might be more general—so as to be generally an improvement upon the manufacture of gas-burners—and we must look to the specification to see which it is. He begins by describing the improvements, and the principle which he says he has discovered, and the mode which he adopts for applying that principle. Then, having done that, he begins: "The improvements in manufacturing the burners consist chiefly." That plainly is not merely describing how it is to be manufactured, which, no doubt, it would have been quite right that he should describe, whether he claimed it or not, but the words, "the improvements in manufacturing," lead one to suppose that he has found some improved mode of manufacturing, and he says, "The improvements in manufacturing the burners consist chiefly in casting and fixing together the principal parts constructed of metal at one operation." Then he goes on to describe how that may be done. Then there are the drawings showing the improved gas-burner, which had been described in the first part of the specification, and then we come to the claim which is the part upon which the whole question turns. He says, "Having now described and particularly set forth the nature of this invention, and the mode of manufacturing the improved burner, I would observe, in conclusion, that I do not confine or restrict myself to the precise details described or referred to, as variations may be made without deviating from the general method by which these improvements are produced." I look upon this particular part about the details more than the first part, because he means to say, "You may adopt my principle without adopting my details," and if you adopt his principle, I think he alludes more to that than he does to the second part, as to the mode of manufacturing. Then he goes on to say, "But what I consider to be novel and original, and, therefore, claim as the invention secured to me by the hereinbefore in part recited letters patent, is the constructing, manufacturing, and means employed in making gas-burners substantially as herein described." Now, it is perfectly plain, as it seems to me, that he does say beyond all question that he conceives the means of manufacturing gas-burners, which he has discovered, to be novel and original—that means that they are novel in themselves. I cannot construe that as simply meaning that they are novel because the gas-burners which are to be made by them are novel—that is not the natural meaning of saying that the means he has discovered are novel. He says, "I claim the gas-burners because they are new; but besides that I have discovered new means of making gas-burners, and because they are novel and original I claim those new means." That seems to me to be the fair mode of construing it. It has been said that it is superfluous. In a certain sense, no doubt, if it could be confined to this particular gas-burner it would be open to the argument that has been mentioned, that inasmuch as there is a claim for making improved gas-burners, going on to claim the mode of making them is superfluous. But when the man tells you that he thinks the mode he has discovered is novel and original, that he thinks that it is new, and, therefore, claims it because it is new, he must mean to say, "I claim that new mode, whether you apply it to these gas-burners, or whether you apply it to any other gas-burners." It seems to me it is quite possible that a gas-burner might be made which would not necessarily be an infringement of the first part, and yet would be an infringement of the second part, if these means were really, as he says they are, novel and original. Therefore, in my opinion, it does come within the case of *Harwood v. The Great Northern Railway Company*. He has claimed the application of old means to the construction of that particular article to which they have not been applied before, and he has not shown that for the purpose of making that application any new invention, or any new discovery in mechanics, was required. He has simply employed means which are old. That is not the proper subject matter of a patent, and, in my opinion, the objection taken in the Court below was a good one, and their decision must be affirmed.

Lord Justice BAGGALLAY: I am of the same opinion, and for the same reasons. I should only be occupying time by repeating them, although I have every desire to give this specification a construction as favourable as possible to the patentee.

Sir W. B. BRETT: In this case it has been argued, on the part of the defendant, that the specification is bad, on the ground that it claims two independent inventions, and that one of those inventions is bad on the ground that it is a claim in respect of that which is not properly the subject matter of a patent. It was answered, on the part of the plaintiff, that, even supposing the objections to be good, they were not properly pointed out in the notice of objections, and that if they were properly pointed out in the notice of objections, that was not valid; and it was said on the part of the plaintiff that there was no claim to two inventions, but only one, and that, if there were two claims, both were good. It was further suggested—I will not say by whom or when—that, even though there were two claims, and the one was bad, yet that, under the circumstances, taking into consideration what the second claim was, the claim might be rejected as surplusage, and the specification would still remain good. Now, as to the validity of the notice of objections, it seems to me that the rule is, that where there is a notice of objection which points to an objection, but not sufficiently, such a defect can only be taken advantage of before the trial, and upon a motion for further and better particulars, and that the only question, if the objection taken is pointed out at all in the notice, is whether the notice is large enough to include the objection. If the objection taken at the trial is not glanced at at all in the notice of objections, it cannot be taken; but if it be glanced at at all, although only imperfectly, that is no objection at the trial. This being, as I apprehend, the rule, I think here the notice of objections was sufficient to raise the point which had been raised. With regard to the question whether this is a claim in respect of two inventions or not, I think it is a claim of two inventions, and not of one only. I think that is to be gathered both from the title of the patent and the words in which the improvements are claimed or described, and also from the claim itself. The title claims improvements in gas-burners, and in the method of constructing and manufacturing the same. There is, then, as it seems to me, the description of an alleged improvement in gas-burners, which description, made applicable by the drawings, is complete in itself, and shows that which, for the purpose of this judgment, is to be construed as an improvement in gas-burners. That is, an improvement in the thing when it is made. Then there is a further statement of improvements in manufacturing the thing, and in the mode of manufacture; those are separate, and are described separately and distinctly, and then the claim is in respect of these improvements. It seems to me that the claim, both of the thing itself and the mode of making something, whether it is the thing itself or not, is to be ordinarily construed. It is a claim, therefore, in respect of two inventions, both of which are inventions by way of improvement. The first, therefore, is a claim for an improved gas burner, and for the present purpose it is to be assumed that that is a good claim. The objection taken is to the second claim, which is as to the mode of making. It was said on the one side that the alleged improvement in the mode of making the burners was bad, whether it was applied only to the casting of the things in moulds, or whether it applied to the casting in moulds and the fixing this casting to something which was not cast, by one operation, that it was bad in either view. In the first place, it seems to me that it does not claim the mere casting; that what it does claim as an improvement is the casting, and the joining that casting to something which is not cast, by one operation. There was a misunderstanding at the trial, I really do think, as to the extent of the admission; but whether that be so or not, I agree with my lord that if we had thought there was any substantial reason for supposing that there might have been a question for the jury as to the facts upon which we should have to construe this, then I should have thought that there might be a new trial, so as to determine what those facts are. But I confess I can see very little colour for supposing that there is any real dispute as to the facts. As to saying the casting is a new process, that, of course, is simply ridiculous, and nobody suggests it. As to saying that joining something which is not cast, to that which is cast, in the moment of casting, is new, that has more colour in it, but very little more, to my mind, and I cannot think there is any real dispute about the matter. Therefore, whichever way you construe the second part of the patent, it does seem to me that it is a claim of something which is not the subject matter of a patent. But then comes the other point, and that is, that although it is claimed, and although the person who made this specification intended to claim it, yet it might be rejected as surplusage. Now, I take it the thing which is claimed at first is an improved gas-burner, and if that be new, the novelty of it would carry with it, of course, the right to the monopoly of it; and if any person were to make the thing substantially, or any substantial part of it, by any means, he would infringe. Therefore the right given to the patentee by that part of the claim, when he claims the thing itself, if the thing is new, gives him, in effect, the monopoly of every mode of making the thing, and his monopoly would be infringed by any mode of making it. Then if the second part, therefore, had claimed only one mode of making the particular burner, it would have claimed in the second part a monopoly of that which, as it would seem to me, had already been obtained by the first part—it would have claimed over again a monopoly of that which is, in effect, claimed and granted in the first part; and if we could have construed the claim to be of the second part, one of the modes of making the burner which is claimed in the first part, I cannot help thinking, and my impression is that it would have been claiming in a superfluous way that which was already obtained in the first part. The truth is, that there is a defect in the formation of this specification; that which we call the second part is made to play a double part, one which is proper, and one which is improper. It is made to play the part of describing the mode of making the burner which is claimed in the first part—that is proper, and I should apprehend it was necessary—but the inventor, or the person who drew the specification for him, has tried to make it claim not only that part but another part—namely, by a

description not only of the mode of making the thing in the first part, but the making of a claim, and an independent claim, in the second part. Although he has made that mistake, if it had pleased Providence that he had confined his mistake to this—to claiming only one mode of making the burner claimed in the first part—as I said before, I should have thought we might have treated that as a superfluous claim, as claiming that which was already claimed and obtained, and we might have said, therefore, that it would not damage the patent, of which the first part was quite good. But that point depends entirely upon this, whether, when we come to look at the claim, it really is a claim of one mode of making this burner, or whether it is a claim of this mode of making any gas-burner, and although in the second part I think the description of the mode of making the gas-burners is a description of the mode of making these burners only, and although I think, in the preparatory part of the claim it is confined to the mode of manufacturing the burner, yet I cannot think, upon any honest construction, I can say that the claim is not larger than the description, and I cannot properly say that the claim is not in respect of all gas-burners. That depends, as I ventured to point out before, upon which of the words you are to join the adverbial phrase, "substantially as herein described," to; and if I thought that we could have defined that phrase, as applicable only to the words "gas-burners," then I think it should have been read, "*the* gas-burners herein described," and that would have been the same as "the gas-burners," and then it would have been confined to a claim of making these gas-burners, and, as I said before, might have been treated as a superfluity. But I think the only grammatical construction of that claim, and the only honest construction, if we are to take into account what is the obvious intention of the man who thought that this mode of doing the thing was new, is that the phrase is to be applied to the words "constructing, manufacturing, and means employed in making," and is not applicable to the words "gas-burners." Therefore, that part of the claim is to be read as if it were "the constructing substantially as herein described, and the manufacturing substantially as herein described, and the means employed in making, substantially as herein described," not "*the* gas-burners," but "gas-burners." It is, therefore, a claim of applying the improvements in manufacturing not only to these gas-burners, but to all gas-burners; and if that be true, it is not superfluous, but it is an independent claim of an independent invention, and being a claim of a mode which is not only not novel, but which has this greater fault, that it is a mode of doing things which is known to all the world, and which has been known to all the world, therefore the defect is not that he is claiming something which is not novel, but that he is claiming something which is not the subject matter of a patent at all. That, therefore, is bad, and the badness of that part of the claim, unfortunately, until disclaimed, makes the whole specification bad, and makes that which was the former good part of the patent, until there is a disclaimer, bad also. Therefore I think the judgment of the Court below was right.

Mr. ASTON: The appeal will be dismissed with costs, I presume?

Sir W. B. BRETT: The costs follow.

GREENWICH POLICE COURT.—FRIDAY, FEB. 16.

(*Before Mr.* PATTESON.)

BREACH OF CONTRACT OF SERVICE BY GAS STOKERS.

Six summonses were entered for hearing against men employed as stokers at the works of the Phœnix Gas Company at Greenwich, to show cause why they should not compensate their employers for the loss they had put them to by leaving their employment without notice.

Mr. HALE, solicitor, who appeared on behalf of the company, said that it was with reluctance that the present proceedings were taken against the defendants; but the company believed it was a public duty to do so, as the act of gangs of men leaving their employment without notice might place the whole district in darkness. The defendants had signed an agreement to work by the week, and a week's notice was to be given on either side. On Saturday evening, the 3rd inst., the defendants ought to have resumed work, but they kept away, and the men at work on Sunday evening had extra work to perform. It was the practice of the engineer of the works to prevent work being done between six o'clock in the morning and six in the evening of Sunday.

Mr. POOK said he represented all the defendants, and he had to express their sorrow for what they had done. He would suggest, as he had already suggested to Mr. Hale, that the costs of the proceedings should be borne by the defendants, and the day's money due to each should be retained. The men were willing to return to their employment.

Mr. WATES, the company's engineer, said he was willing that this course should be adopted.

Mr. PATTESON told the defendants that the company had acted most leniently towards them, and they then left the Court.

WOLVERHAMPTON POLICE COURT.—FRIDAY, FEB. 9.

(*Before Mr.* SPOONER.)

REFUSAL TO SUPPLY GAS FOR NON-PAYMENT OF RENT.

Mr. G. A. Davenport, chemist and druggist, of Queen Square and Chapel Ash, summoned the Wolverhampton Gas Company for illegally cutting off the supply of gas to his two places of business.

Mr. PLUMPTREE appeared for the plaintiff, and Mr. UNDERHILL for the defendants.

The case for the plaintiff was that, in the year 1874, he, believing that the gas-meter supplied to his Chapel Ash premises by the defendants was incorrect, made a complaint to that effect, and alleged that he was thus charged for more gas than he consumed. He was desirous to have a dry meter fixed at each house, but this the company objected to, and eventually it was arranged that the suspected meter, which was on the premises at Chapel Ash, should be removed, and sent to London or Birmingham to be tested. If found to be correct, the expense was to be paid by Mr. Davenport; if incorrect, by the company. The meter was never returned to him, but he was informed that the result of the test showed that it was accurate. Plaintiff declined to pay £4, the cost of testing, and the matter had remained unsettled up to the present time. Eventually the company sent him an account for £23 odd for gas supplied, but against that he had a claim for £19 as a set-off for goods supplied, leaving a balance of over £4 alleged to be due to the gas company. After considerable correspondence between the parties, the dispute not being settled, on the 27th of January the company cut off the supply of gas at both his shops, and it had been cut off ever since. Although the complainant did not claim any penalty, the penalty was 40s. for each day that the gas was cut off improperly. The plaintiff contended that, under the circumstances, the company were not entitled to cut off the supply at all, but must recover by civil proceedings as for ordinary debt, and that, even if they were entitled, their power of suspension of supply was confined to the premises at Chapel Ash, which was the disputed supply.

Plaintiff, in his evidence, stated that, owing to his having been involved in a heavy Chancery suit in 1874, he deemed it advisable, amongst other things, to reduce his burning of gas to enable him to find funds for the Chancery suit. Instead of his gas bill being very much lower, he found that it increased. He said the company took away the meter about which he complained, and he had never heard of the result of the test from the day it was removed up to the present time. He spoke to a number of disputed items in the accounts between the company and himself, and also as to paying the account from September to December 31, which he did not dispute. He did not pay under a threat to cut of his supply.

In cross-examination, plaintiff said he had never promised Mr. Manby to pay the money in dispute if he was allowed time until after Christmas. He was still without gas at the present time.

Confirmatory evidence having been given by Mr. *C. A. Davenport*, a son of the plaintiff,

Mr. UNDERHILL addressed the magistrates on behalf of the defendants, and submitted that the Bench had no jurisdiction to make an order under the summons, as by their Act the company were authorized to cut off the supply of gas when a consumer neglected or refused to pay his gas-rent.

The MAGISTRATE said the point he had to decide was whether there was any actual dispute between the complainant and defendants, and if so, whether the latter were bound to proceed with the cutting off the supply, particularly with regard to the Queen Square shop.

Mr. UNDERHILL said the arbitrary powers of the company were given them to meet cases exactly like the present one, the complainant being one of those persons who trouble the company to the very last.

The MAGISTRATE said that though he considered the question of dispute was merely nominal, if not a sham, yet he also thought that the gas company had acted harshly in the matter. They ought to have taken steps to recover the gas-rents due, before cutting off the supply of gas.

Mr. UNDERHILL said nothing could have been easier than for Mr. Davenport to pay the money in dispute under protest, and then he could have brought his action for an illegal demand.

The MAGISTRATE said he found entirely that the question of dispute raised was "a mere sham," but he still thought that the company had acted harshly in cutting off the supply of gas at both shops. He decided for the gas company by dismissing both summonses, but gave them no costs.

The summons with respect to the Queen Square shop was dismissed, subject to the complainant taking a case for a superior Court.

NORWICH POLICE COURT.—FRIDAY, FEB. 9.

(*Before Messrs.* BETTS, HARVEY, REEVE, WELLS, *and* BARNARD.)

CONVICTION FOR FRAUDULENTLY DISCONNECTING A METER.

William Sillis, of the "Excise Coffee-House" public-house, Goat Lane, was summoned for feloniously stealing 20 cubic feet of gas, of the value of one penny, the property of the British Gaslight Company, Limited. He was further charged with causing to be laid a certain pipe to communicate with a certain other pipe, for conveying gas to his premises, belonging to the said company.

Mr. A. PRESTON (solicitor to the company) prosecuted, and having opened the case to the Bench, called the following witnesses:—

Mr. *E. Crowe*, an inspector in the employ of the company, said that about half-past seven on Saturday night, the 3rd inst., he went with another inspector, named Metcalfe, to the defendant's house. The defendant and Mr. Fiske were behind the bar. Witness called for some beer and gin for Metcalfe and himself. Defendant then asked witness to have something at his expense, but this witness declined, and told defendant he wanted to have a word with him. Witness then passed behind the bar, and went into a kind of lobby, and told Mr. Sillis that he wanted to look at the gas-meter. Defendant said he could not see it that night. Witness replied that he must see it, and defendant said, "What do you want to see it for?" and witness replied, "For the purpose of taking the register," and that he was specially sent, and must not leave the house until he had seen it. Defendant then said, "You can leave the house for a few minutes," but witness said he could not do that, as the Act gave him power to see the meter at any time. Defendant thereupon told witness to go across the way and get a glass, adding that he would "square" him when he came back. Witness said that would have no weight with him, and that he would see the meter. Defendant said, "I am a poor, hard-working man, and do you want to ruin me? What do you want to do to me?" Witness said he had nothing to fear, but if he refused to let him see the meter he must send for Mr. Hoddy. Defendant asked who Mr. Hoddy was, and witness replied that he was the chief clerk at the company's town office. Defendant then left witness, and went into the bar, and had some conversation with Fiske, which witness could not hear. Sillis then went down a trap-door at the back of the counter into the cellar, and Fiske stood on the trap-door. Witness waited quite a quarter of an hour without seeing Sillis again, and for about two minutes of that time the gas went very nearly out. When defendant came up from the cellar witness went down with him. When there Sillis said, "Now what do you want?" and lifted up the door of the meter, and asked witness what the register was. Witness told him, and defendant asked what the last register was, but this witness did not know. Witness then looked about the place, and after examining the meter he told defendant that the meter unions had been tampered with. Defendant said, "What do you mean?" and witness said that he was sure the pipes had been tampered with. The pipes were mouldy, but the unions were bright. Witness saw Mr. Hoddy at the top of the steps, and called him down; and when he came down witness repeated his charge against defendant, but he said that he knew nothing about it. Witness asked defendant to produce the pipe with which he supposed the tampering had been done; but defendant said he knew nothing about it. Mr. Hoddy said he would have a search warrant, and the defendant said they could search where they liked. They did search the cellar, and in a kind of dead well witness found the piece of pipe produced. It consisted of two pieces of iron bend fastened together with a piece of india-rubber tube. It was about 1½ inch in diameter. As it was it would exactly fit upon the two unions each side of the meter, so that the gas passing through it would not go through the meter. When witness first found the pipe it smelt very strong of gas, and the screws had the appearance of having been very recently used.

In cross-examination by Mr. LINAY, who appeared for the defendant, witness said he had fitted the pipe produced upon two unions exactly the same as on Sillis's meter, and it fitted exactly. The screw was bright when he first saw it. The distance from the inlet-pipe to the outlet-pipe corresponded precisely with the length of pipe produced. It was possible to disconnect two pipes, and lights continue to burn for two minutes. It was a very uncommon thing for the unions to be bright; but if repairs had been recently made to them, that would tend to brighten them, but would not make them as bright as they were on defendant's meter.

Mr. REEVE asked Mr. Preston to let witness take the pipe down to the defendant's house and fit it upon the unions in the presence of a policeman and Mr. Linay's clerk; for if they did not fit, there would be an end to the case for the prosecution.

Mr. *Metcalfe*, the other inspector, corroborated the last witness.

Mr. *R. W. Hoddy* said that on Saturday last he went to the defendant's house about eight o'clock, with Metcalfe and a police officer. He went down the cellar and inspected the meter and unions. They looked bright, as if they had been recently disturbed, and witness accused defendant of having used a pipe for the purpose of obtaining gas without its passing through the meter. The pipe was large enough to supply half a street.

In cross-examination by Mr. LINAY, witness said that defendant's gas bill had increased since the last quarter. The bills for the months of December and January were about the same.

In answer to Mr. REEVE, witness said that he gave the man special instructions to go to defendant's house, as he had suspicions that such an instrument was being used by the defendant.

Mr. *Crowe*, recalled, said that he had just been to the defendant's house, and the piece of pipe produced exactly fitted the unions on defendant's meter, and it could be so applied as to obtain gas without its going through the meter.

In answer to Mr. LINAY, witness said he could not fit the pipe on the meter without taking it down from a shelf. He did not notice that the shelf was very dusty, and that it had the appearance of not having been disturbed for a long time. He did not notice that when the meter was disturbed, a quantity of corks and a bung fell from behind it. Witness considered that the meter could be taken down and the connexions made in the space of one or two minutes.

The BENCH, after hearing Mr. Linay, decided to hear the other cases before adjudicating upon this.

The same defendant and *James Fiske* were then charged with having hindered Edward Crowe, duly appointed by the company, from entering a certain place, viz., a cellar, to ascertain the quantity of gas consumed or supplied by them. Crowe having given evidence similar to that in the first case, Mr. Linay submitted that there was no case against them, as in the first place Crowe did not even ask Fiske to let him go down the cellar, but when he said he must go, Sillis came up, and they then went down together, and therefore he could not see how Crowe had been hindered in any way whatever.

Mr. PRESTON said he would withdraw the case of stealing gas.

The CHAIRMAN characterized the offence as a very grave one, as it would be a very serious thing for the shareholders of the company if they were robbed in this way by people whom they supplied with gas. For the first offence, Sillis would be fined £5 and £1 17s. costs, or two months imprisonment. In the second case he would be fined £2 and 7s. costs, or one month's imprisonment. The case against Fiske would be dismissed. In the event of the fines not being paid, they would be levied by distress.

WARRINGTON POLICE COURT.—FRIDAY, FEB. 16.

(*Before Aldermen* HOLMES *and Mr.* RIGBY.)

A GAS STOKER SENT TO PRISON.

Edward Lucie, a stoker in the employ of the Warrington Gas Company, was brought up in custody under the Masters and Servants Act, and charged with breach of contract.

Mr. *Paterson*, the manager, said that the prisoner had absented himself from his work without leave on Sunday and Monday last. The foreman called upon him on Sunday night, and he promised to come the next day, but he failed to do so. The loss the company had sustained through his absence was considerable, but it was estimated at the nominal value of 20s. Several of the men had also absented themselves, and it was necessary to press this case as a warning to others. There was a notice put up in the works stating the consequence of their absenting themselves without leave, but it had no effect.

The prisoner said he did not feel well on Sunday, and that was the reason he did not go. He admitted having wilfully remained away the next day.

The MAGISTRATES said the Act gave them no option in the matter, and sentenced him to 21 days imprisonment with hard labour.

LEEDS POLICE COURT.—WEDNESDAY, FEB. 14.

(*Before Mr.* BRUCE.)

ILLEGAL USE OF CORPORATION WATER.

Mr. *Samuel Wolfe*, of the Leeds Lead-Works, New Briggate, was summoned, under the 43rd section of the Leeds Improvement Act, for having used the Corporation water for purposes other than that for which it had been agreed to be supplied.

The TOWN-CLERK prosecuted, and stated that the defendant had been supplied with water for building a number of houses in St. George's Terrace, and without permission he had taken the water into one of the houses and used it for domestic purposes.

The *Defendant* pleaded guilty, and was fined £10.

ABERDEEN POLICE COURT.—THURSDAY, FEB. 8.

(*Before Bailie* SMITH.)

CONVICTION FOR STEALING GAS.

Timothy Shaw, shoemaker, residing in the Gallowgate, was charged with having contravened the Aberdeen Municipality Extension Act, in so far as during the three months prior to the 31st of January last he had fraudulently prevented the index of the gas-meter placed in his house from duly registering the proper quantity of gas supplied.

Defendant pleaded guilty.

The BAILIE said it was an offence that must be put a stop to, for only the other week he had had to deal with a similar case. It was as mean an offence as one could possibly commit, seeing the price of gas was not dear, and it was an offence against the whole community of Aberdeen. Defendant would have to pay a fine of £4, with the alternative of 40 days imprisonment.

Miscellaneous News.

METROPOLIS GAS SUPPLY.

COURT OF COMMON COUNCIL.—At the meeting of the Court on Thursday last, the Gas and Water Committee reported the proceedings they had taken during last year under the several references relative to the Metropolis Gas Companies Bill in Parliament. The report ended by stating that the Remembrancer had reported to the committee that he is, under the orders of the Corn and Coal and Finance Committee, by the authority of the Court, promoting a Bill for giving various powers to the Corporation, and that he proposes in that Bill to correct a mistake made last session in The Gaslight and Coke Company Act; and the Remembrancer further reported that the Metropolitan Board of Works concurred in the steps he had taken. The mistake was the omission of the 91st and 92nd clauses of the City of London Gas Act, 1868, which it was intended to embody in the new Act. On the motion of Mr. Shuter, the report was adopted.

METROPOLITAN BOARD OF WORKS.—At the meeting of the Board on Friday last, the Works and General Purposes Committee made a report in which they recommended that Mr. Addenbrooke be appointed Gas Examiner to test the gas supplied by the Commercial Gas Company, at the two testing-places fixed by the Gas Referees in Wellclose Square and Parnell Road, at a salary of £150 per annum. The other conditions of his appointment being the same as those attached to the appointment of the other Gas Examiners. They further recommended that the Board of Trade should be informed, with reference to the letter of the Gas Referees, as to the difficulty of fixing testing-places, in consequence of intercommunication between the mains coming from different works, that in the opinion of the Board the difficulty can only be removed by an amendment of the Act of Parliament. The Clerk read a letter from the Woolwich, Plumstead, and Charlton Gas Company, in answer to a communication from the Board, asking whether, in the Bill promoted by them this session, they were willing to adopt the provisions of the South Metropolitan Gas Act of last year, so far as they relate to price, illuminating power, and mode of raising capital. The company stated that they had referred the matter to their parliamentary agent for consideration. This reply not being deemed satisfactory, the Board resolved to petition Parliament against the Bill, so as to obtain a *locus standi*.

Dr. Stevenson's report on the gas supplied by The Gaslight and Coke Company to the vestry of St. Pancras, during the month of January:—Maximum light, estimated by sperm candles, according to the Act—17·5. Minimum light, sperm candles—16·1. Average light, sperm candles—16·3. Traces of ammonia, indicated by turmeric test-paper—Traces on all occasions. Traces of sulphuretted hydrogen, indicated by lead test-paper—none. Sulphur determinations not given, as a leakage was discovered in the meter, which vitiated the experiments.

Dr. Whitmore's report on the illuminating power, pressure, and quality of the coal gas consumed in the parish of Marylebone, supplied by The Gaslight and Coke Company, during January:—

	Illuminating Power in Sperm Candles.			Mean Pressure in Tenths of an Inch.		Mean Quanty. of Sulphur in 100 Cu. Ft.	Mean Quanty. of Ammon. in 100 Cu. Ft.	Sulphuretted Hydrogn.
	*Mean of 24 Obser.	Highest.	Lowest.	Highest.	Lowest.	Grains.	Grains.	
Gas supplied from the Fulham works . .	16·35	17·59	15·91	22·26	8·44	15·66	0·53	No trace
Gas supplied from the Beckton and Bow works	16·08	17·04	15·52	29·38	15·01	11·99	0·46	No trace
Cannel gas supplied from the Pimlico works	20·40	21·40	19·31	18·61	11·52	15·40	0·53	No trace

Mean of daily readings of barometer . . . 29·61
" " " thermometer . . . 58·99

* Each observation consists of ten readings of the photometer, at intervals of one minute.

The mean illuminating power of the gas supplied from the Fulham works was equal to 16½ candles, from the Beckton and Bow works to rather over 16 candles, and of the cannel gas from the Pimlico works to about 20½ candles; they ranged from about half a candle under the standard to a candle and a half above the standard. The mean quantity of sulphur found in 100 cubic feet of the Fulham gas was 15½ grains, and of ammonia half a grain; in the gas from Beckton and Bow the sulphur amounted to a mean of 12 grains, and the ammonia to less than half a grain; and in the cannel gas the sulphur amounted to a mean of 15½ grains, and the ammonia to half a grain. The night pressure of all the gases was very good, but the day pressure of the Fulham gas was occasionally low. No trace of sulphuretted hydrogen was on any occasion found in either of them by the ordinary tests.

METROPOLIS WATER SUPPLY.

The Registrar-General publishes the following return of the average daily quantity of water supplied by the London Water Companies during January. According to this, 112,205,609 gallons, or 509,801 cubic mètres of water (equal to about as many *tuns* by measure, *tons* by weight), were supplied daily; or 212 gallons (96·1 decalitres) rather less than a *ton* by weight, to each house, and 29·8 gallons (13·5 decalitres) to each person, against 30·1 gallons during January, 1876.

COMPANIES.	Number of Houses, &c., supplied in Jan., 1876.	Number of Houses, &c., supplied in Jan., 1877.	Aver. Daily Supply of Water in Gallons* during Jan., 1876.	Aver. Daily Supply of Water in Gallons* during Jan., 1877.
Total supply	523,487	530,464	112,034,444	112,205,619
From Thames	245,766	247,965	56,732,457	56,521,086
" Lea and other Sources . .	277,721	282,499	55,301,987	55,684,533
THAMES.				
Chelsea	28,600	28,737	6,709,800	6,869,000
West Middlesex	47,490	48,762	9,252,877	9,290,314
Southwark and Vauxhall . . .	80,322	77,800	18,100,000	17,500,000
Grand Junction	36,036	37,055	10,380,880	10,858,962
Lambeth	53,318	55,611	12,288,900	12,002,800
LEA AND OTHER SOURCES.				
New River	124,036	125,100	26,089,000	25,192,000
East London	109,375	111,967	22,562,000	23,902,000
Kent	44,290	45,432	6,650,987	6,590,533

* Including that for manufactures and for various purposes other than for domestic consumption.

Note.—The return for January, 1877, as compared with that for the corresponding month of 1876, shows an increase of 6977 houses, and of 171,165 gallons of water supplied daily. A decline of 2522 was shown in the number of houses supplied by the Southwark and Vauxhall Company, in consequence of their having withdrawn their supply from Richmond.

Dr. Frankland, F.R.S., reports, as the results of his analysis of the waters supplied to the inner, and portions of the outer, circle of the Metropolis during the month of January, that, taking the average amount of organic impurity contained in a given volume of the Kent Company's water during the last nine years as unity, the proportional amount in an equal volume of water supplied by each of the Metropolitan Water Companies, and by the Tottenham Local Board of Health, was—Tottenham 0·7, Kent 1·3, Colne Valley 1·4, New River 5·0, East London 5·1, West Middlesex 6·0, Lambeth 6·0, Grand Junction 6·9, Chelsea 7·0, and Southwark 8·0. The Thames continued in high flood during the month, and in consequence the water delivered by the Chelsea, West Middlesex, Southwark, Grand Junction, and Lambeth Companies, was again much polluted by organic matter of a very objectionable origin. Although the pollution was somewhat less intense than in December, the water was still quite unfit for dietetic purposes, even when delivered in an efficiently filtered condition. The West Middlesex was, however, the only company, drawing from the Thames, who sent out to their customers efficiently filtered water; the supplies of the Lambeth, Southwark and Vauxhall, Grand Junction, and Chelsea Companies contained moving organisms, and the water of the three last-named companies fungoid growths. The water of the Lea, though better than that of the Thames, was much more

polluted in January than in December, and was unfit for domestic use. The East London Company filtered this water efficiently, but the New River Company supplied it in a slightly turbid condition, and moving organisms were found amongst the suspended matters. The water supplied from deep wells to the inner circle by the Kent Company, and to the outer circle by the Colne Valley Water Company and the Tottenham Local Board of Health, was entirely unaffected by the long continued rains and floods. It was palatable, bright, and sparkling, and contained only mere traces of organic matter, and was of most excellent quality for dietetic purposes. The water of the Colne Valley Company is softened by lime before delivery, and is thus rendered serviceable for washing and bathing. Whilst the Kent and Tottenham waters have respectively 28° and 33½° hardness, the Colne Valley has only 5°. The proportion of total solid matters in solution is also correspondingly reduced by this softening process. It was water from this source and this quality which the Rivers Pollution Commission recommended to be gradually substituted for the water supplied to inner London. Seen through a stratum 2 feet deep, the Kent, Colne Valley, and Tottenham waters were clear and colourless, the East London was clear and very nearly colourless, the West Middlesex clear and pale yellow, the New River slightly turbid and very pale brown, the Lambeth slightly turbid and pale brownish yellow, the Chelsea slightly turbid and pale brown, the Grand Junction slightly turbid and brownish yellow, and the Southwark turbid and brown.

Results of Analysis expressed in Parts per 100,000.

Companies or Local Authorities.	Total Solid Matters.	Organic Carbon.	Organic Nitrogen.	Ammonia.	Nitrogen, as Nitrates and Nitrites.	Total combined Nitrogen.	Chlorine.	Total Hardness.
Inner Circle.								
Thames—								
Chelsea	27·52	·355	·058	0	·244	·302	1·42	17·4
West Middlesex	27·94	·285	·071	0	·289	·360	1·47	18·0
Southwark and Vauxhall	27·60	·403	·067	0	·228	·295	1·45	18·3
Grand Junction	28·20	·335	·071	0	·239	·310	1·50	18·4
Lambeth	30·20	·296	·058	0	·320	·378	1·65	19·1
Other Sources—								
New River	30·20	·255	·041	0	·333	·374	1·50	20·3
East London	31·40	·249	·051	0	·230	·281	1·72	19·7
Kent	43·68	·056	·021	0	·472	·493	2·35	28·1
Outer Circle.								
Colne Valley	12·26	·059	·025	0	·310	·335	1·35	5·0
Tottenham Board of Health	55·52	·028	·015	·032	1·450	1·491	4 52	33·5
Corporation of Birmingham*	27·02	·528	·093	·003	·154	·249	1·40	19·6
Corporation of Glasgow†	2·00	·151	·053	·002	·003	·058	·71	·7

* Analyzed by Dr. Alfred Hill, Medical Officer of Health and Analyst to the Borough.
† Analyzed by Dr. E. J. Mills, F.R.S., of the Andersonian University, Glasgow.

Note.—The numbers in the analytical table can be converted into grains per imperial gallon by multiplying them by seven, and then moving the decimal point one place to the left. The same operation transforms the hardness in the table into degrees of hardness on Clark's scale.

Dr. Whitmore's report on the composition of Thames companies and other waters supplied to Marylebone during January:—

	In Grains, per Gallon.			In Parts, per Million.		In Degrees.	
	Total Solid Matter.	Loss by Incineration.*	Chlorine.	Free Ammonia.	Albuminoid Ammonia.	Hardness.	Hardness after boiling Fifteen Minutes.
West Middlesex	20·32	1·60	1·16	·026	·099	14·1	3·2
Grand Junction	20·42	1·12	1·21	·016	·108	14·2	3·3

* The loss by incineration represents the amount of organic and other volatile matters contained in the Imperial gallon (70,000 grains) of water.

During the month the water supplied by the West Middlesex Company maintained its customary clearness and brightness; the water supplied by the Grand Junction Company was, on two or three occasions, slightly turbid and coloured. The heavy rainfalls in the month rendered the water of the Thames at times very turbid.

SOUTHERN DISTRICT ASSOCIATION OF GAS ENGINEERS AND MANAGERS.

The Second Annual Meeting of this Association was held at the Bedford Hotel, Southampton Row, London, on Thursday, the 10th inst. There were 17 members present.

Mr. ELDRIDGE (Richmond) was called to the chair, and he proposed that Mr. Wood, of Hastings, should again be asked to act as president, he having so ably filled that post during the past year; and considering the youth of the Association, and the manner it had progressed under him, it would be much to its advantage to re-elect Mr. Wood.

The proposition was carried unanimously, and Mr. Eldridge vacated, and Mr. Wood took the chair.

Messrs. West and Farrand were elected committeemen in the place of Messrs. Parlby and Price, retiring by rotation. Mr. Eldridge was again elected treasurer, and Mr. Chapman honorary secretary. Messrs. Botley and Price were elected auditors. Five new members were added, making a total of 32 since the formation of the Association, at the end of the year 1875.

The PRESIDENT then read the following address:—

Gentlemen,—Allow me to thank you very cordially for the confidence you have manifested towards me in again asking me to take the presidential chair of this Association. I confess, without any mock-modesty, that I hoped some one of our members, better qualified than myself, would step forward, and allow me to drop back into the ranks; but, as it seems to be desirable that as little change as possible should take place in the management of the Association for another twelvemonth, I bow to your invitation, and promise, however humble may be my efforts, that I will do my best for the interests of the society.

The Association is as yet young, but has, as a district one, been in every way all that we expected. It is distinctly understood amongst us that our meeting together should be of the most communicative character. We are anxious to drop as much of formalities as it is possible to do, consistent with the interest and object of our meetings, and to show as little reserve, and throw open for each other's use all those details in gas manufacture which could not be done in a more extensive Association in the way that we can do in our mutual gatherings.

That this has been fully attained no one who has met with us can for one moment doubt. The very nature of the papers that we have had, and more especially the nature of the discussions on them, have proved this to be the case. There has been a frankness and an openness of communication in all our meetings, which, by being thoroughly unrobed from ordinary speech-making, has been productive of a large amount of interest, and I may conscientiously add profit; and the questions which have been asked and answered have proved beyond a doubt the willingness of one and all to add to the general store of information.

If we take a short review of the papers we have been favoured with, we shall, I think, find all that I have advanced fully borne out. First, we had Mr. West's paper on "Mechanical Stoking;" and, although many of us had both heard Mr. West, and seen the apparatus in operation, the subject had lost none of its interest; but, when we came to the discussion, the value of our proceedings was specially manifest. The pertinent questions which were good-humouredly hurled at the reader by dozens, and the satisfactory answers which were as readily given, proved the value of our chit-chat meetings, and of our mutual mode of proceeding, beyond a doubt.

Then we were favoured with a very useful and practical paper by Mr. Scott, "On the Setting of Retorts." Iron retorts had their share of discussion (and, perhaps, a little more than their share), and clay retorts had their share—every question relative to shape and size, large settings and small, benches and drafts, furnaces and chimneys, was thoroughly ventilated; and one and all owned we had had a most useful and instructive meeting.

Our third meeting was profitably occupied by discussing the very trying and perplexing question of one of our most important residuals—"Coke." Every one regretted that Mr. Farrand, from indisposition, could not be with us to read his paper on this subject, and join in the discussion; still he was well represented, and the subject received its due consideration. I am afraid, from the mildness of the past winter, and the consequent sluggishness of the market in this residual, that we may have to consider the subject again, and I am not at all sure that some mechanical means of crushing coke, so as to enable us to sell it as breeze or ashes, might not enable us to realize better financial results than the present low prices yield us. Ashes are, in some districts, in such demand for brick-making, and realize such a high price, while coke itself is low, that it becomes simply the question of labour and expense of crushing, as to whether it will not yield better results to make coke into ashes than to sell it as it is.

Our last meeting was occupied by considering the important question of "Washing and Scrubbing,"—ably brought forward by Mr. Eldridge. All the old means of washing, as well as all the new, were fairly and properly discussed. The Coffey still had another hearing, and all agreed that both the paper and discussion were not only very instructing, but also interesting. It is an important subject, and well deserves further consideration.

Nor have I the least fear but that our future papers will be fully as interesting as the past ones have been, as there is not one of the multitudinous qualifications of a gas manager that may not form a profitable subject for discussion; a gas manager consisting of almost every variety of commercial, mechanical, and chemical qualification rolled into one individual, and that individual supposed to be possessed of all the details of each subject, and ready at any moment to answer any and every question referring to it.

Take, for instance, the all-important subject of carbonization of coal. There is, in the first place, the commercial qualification to be brought out in the purchase of the yearly stock—and this sometimes involves considerable anxiety and forethought—the proper coal to purchase, the best time to make the contracts, the different times of delivery, are all, more or less, questions which require mature consideration. Then, in other cases, the mode of transit; and, if by water, the best time to make freight contracts, together with cartage, trimming, and other matters connected with storing, all tax the commercial part of the gas manager. Sometimes an extra discount can be procured on the coal. At other parts of the year freights vary to a considerable figure per ton. Sometimes railway authorities are squeezable to the extent of a few pence per ton; and, at other times, cartage, delivery, trimming, &c., can be contracted for at a lower figure than at other times. All these things put together, and multiplied by some thousands of tons, make important items in the financial condition of the company, and frequently have an important influence on the half year's dividends. Hence the necessity of the gas manager being a truly commercial man, and keeping himself well informed on those points referring to the commercial interests of his company; and I do not know of any better means of promoting this than by meetings like our own. On this subject we proved their value in 1872, and may, perhaps, have to do so again.

But no sooner has the manager carried out this commercial part of his undertaking, than his skill has to be exerted in the mechanical department, hence the very valuable paper by Mr. Scott, to which I alluded just now; and here a mixture of his commercial and mechanical qualifications of necessity crops up. Not only which is the best bench and setting of retorts has to be considered, not only their size, shape, and number, but which are the best in construction, which endure most wear and tear, which are made of the best material, which are the most lasting. It costs as much to set a bad retort as it does a good one, and, therefore, it requires but little calculation to prove that a retort may be 6d. or 9d. per foot run higher in price in the first instance, and yet may be cheaper in the end, and all this the manager has to consider before he commences to carbonize his coal.

And now comes the necessity of a still further admixture of qualifications. Some amount of chemical knowledge here makes itself manifest. I once heard of a manager—at least, one who had the responsibility of a manager—who said he did not bother himself about high or low heats, nor did he know anything about quality or illuminating power. What he did was to put the coal into the retorts, and out came the gas into the holders. This was all he knew, and all he cared to know. I confess this was some 25 or 30 years ago, the acknowledgment being made on his being asked to adopt a photometer. I am not at all sanguine that this gentleman's certificates would secure him a very lucrative appointment in the present day, nor am I aware how long his qualifications retained to him his then position. Certain I am that it would not do now, and that if he did not increase his knowledge apace, some one of his younger brethren would want his shoes.

But here, I say, the properly qualified manager has to exert his skill and chemical knowledge in addition to, and intermixed with, his mechanical experience. He has to decompose his coal into its constituent parts, and he has to do this in the most economical manner. Some are contented if they can make 9600 or 9700 cubic feet of gas from a ton of Newcastle coal, others hold the doctrine that if there be 10,000 cubic feet in the ton, it ought to be had out. The man who argues for the smaller quantity can afford to work with rather lower heats, with less wear and tear on his retorts, and probably a less per centage of cannel to make up his illuminating power, while the 10,000 man has to drive at very high heats, or use less charges, use more cannel, and condemn his retorts at a less age. Which of these two is the better? Which is the more economical? Which in the end makes the most of his ton of coal? Or, in still plainer terms, which yields the best financial results? This is an important question, which can sometimes only be decided by the manager in charge, and who is sometimes governed by circumstances of a local character, that do not so much affect another place. I am not here to-day

to give an opinion as to which of these courses is the best; but I throw out these hints as being suggestive of a good and useful subject for discussion.

One thing here I feel it my duty to make a remark upon, and that is that there should be no interference of the directors in these matters. I say it with all due respect, that directors, as a rule, are not competent to judge what coal should be used, or how much gas should be made from it. I have known cases where an inferior coal has been forced upon the manager, and yet the highest results expected from him. This is altogether an anomaly; you might as well expect "grapes from thorns, or figs from thistles," as to expect the highest results from a second-class coal. The coal should be of the highest class, and then the manager may be expected to yield good results at the end of the financial period, whether he be a 10,000 feet man or not.

And what are condensing, washing, scrubbing, and purifying but the true employment of a manufacturing chemist? Chemical combinations are continually going on, impurities attracted by stronger allies, ammonia, sulphur, and other impurities, extracted and left behind, while the gas, in its cleansed and purified form, passes on, until it is produced fit for the consumers burners; all this is the work of a true practical chemist. And question upon question arises in the thinking manager's mind as to the best and cheapest mode of carrying out these operations. Shall we have old-fashioned scrubbers, *douché* scrubbers, washers, or the Coffey still? Shall we fill up our scrubbers with boulders, coke, drain-pipes, furze, boards, or some other unheard-of material? Shall we work with a pressure from these, or aim at working without? All these questions the manager has to decide, and adopt that which promises him the best results with the least wear and tear and cost.

The same remarks apply to purifying. Some works, and large ones too, still use only lime for purifying, others use oxide of iron, and some a combination of the two; and then comes the question again, which is best? No doubt locality has much to do in deciding this question. Lime may be used at some places, while we dare not name it at others, but are compelled to fall back upon a manufactured article.

And then comes the question, if we are compelled to use a manufactured article, which is the best—which takes up the impurity the easiest, holds it to the greatest extent, and is capable of working with the highest amount of impurity in combination? All this has to be well considered by the manager as most suited to his particular case, overruled very often by the local circumstances by which he is surrounded.

Intimately connected with these questions is the important one of temperature. We are all aware of the increase and decrease of volume dependent on the variations of temperature, and how requisite it is to take accurate observations on this point at the inlet and outlet of the station-meters, in order to ensure a proper measurement of gas manufactured; but there are other considerations closely connected with the question of temperature, to which we shall do well to give our serious consideration. It is generally admitted that the more slowly and the more evenly the gas is cooled, and the longer it is kept in connexion with the warm condensing liquid hydrocarbons, the more the gas will retain of its original richness, and for this reason it is customary with most of us to carry our gas round the inside of the retort-house, and make it travel as long a passage as we can before it reaches the actual condenser; and the longer passage it travels, in reason, before it reaches this stage of manufacture, the better for the permanent quality of the gas. Nothing is so detrimental to the luminosity as a sudden check of temperature, and nothing so productive of stoppages of apparatus as this. Hence it is wise on our parts, not only to watch the temperature of our gas as it enters and leaves our station-meters, for the sake of the accurate measurement, but also to watch it at every point of every process of the manufacture, main thermometers being fixed in every available position, especially at the inlet and outlet of the condenser, at two or three suitable points on the washer or scrubber, at all suitable points in the inlets and outlets of the purifiers, and at any other part of the works where an indication might be useful in detecting any sudden falls of temperature. These thermometers should be protected from the sun's rays and all auxiliary heat, and the register taken regularly once or twice a day; by this means we should always discover any sudden change of temperature, prevent deposit and stoppage, and frequently save something in the shape of quality in our gas.

There is one very important question in the present day, which I think our society will be very useful in enabling us to cope with. I allude to the labour question. Since our troubles of 1872, iron has gone down considerably; coal has followed in a measure; but the labour question is still as difficult as ever, and, in some cases, more so. If men will combine for their interest, managers must do the same for theirs. I am quite aware that the market value of labour is different in almost every locality. I had a proof of that recently, when I wrote to something like twenty-five managers on the question of stokers pay, and found no two answers alike in the whole twenty-five replies; but, notwithstanding this, we can interchange much useful information on the subject, both as regards the amount of work done per man per day, and the amount of remuneration given.

There are other questions, however, in the management of men apart from the question of wages. The general treatment of our men should be such as to gain their respect. Some of them, we know, are rough diamonds; but they are men, nevertheless, and as men and fellow-men, too, we should treat them. If we find some thoroughly unworthy of our confidence, after sufficient testing, the sooner we part with them the better, or they will, perhaps, corrupt their fellow-workmen; but, if worthy of our confidence, the meanest labourer is entitled to our good feeling, and ought to be treated as our fellow-man.

Nor is this a matter of good feeling only, as I am quite sure in the long run it is a matter of advantage to the manager and the company. A smile will get far more work done than a frown. A good word will make a man work with pluck, while an angry one will but encourage him to lag as soon as your back is turned. The question is quite a mutual one, and we ought to aim at gaining the confidence of our men, as well as expecting them to gain the confidence of their manager. I cannot help feeling we are responsible for the good treatment and kind behaviour towards those who are under us, and well may one of old say on this point, "If I did despise the cause of my manservant, or of my maidservant, when they contended with me, what then shall I do when God riseth up, and when he visiteth what shall I answer him? Did not he that made me in the womb make him? And did not one fashion us in the womb?" My brother managers, we are far nearer a level with the men who work under us than we are sometimes apt to think; and it will do us no harm, now that we are by ourselves, to take that view of it, and, when we are with them, to treat them kindly and as men.

Now, what I have said in relation to our duties to the companies we represent, I have not said with a view of dictating those duties to my brother managers; but simply with a view of breaking up the fallow ground for future papers and future discussions. As I remarked before, our qualifications are very multitudinous; but, many as they are, they are all suitable for our mutual consideration at our future gatherings.

Granted, then, that our duties are very varied; that we require not only commercial, mechanical, and chemical knowledge, but are required to know a little of almost every branch of science; that we are at all calls, morning, noon, and night; that almost every meal is liable to be broken in upon; that we have to represent the interests of the company to some thousands of customers, to the satisfaction, perhaps, of some hundreds of shareholders; that we have to manage a large number of workmen, and more or less superintend their work; what ought to be the remuneration of a gas manager, and how ought he to be paid? There is doubtless a commercial value to a gas manager, as well as a commercial value to every other profession. How is this to be arrived at? What is his real value, and how is it to be ascertained?

Sometimes it has been argued that the quantity of coal carbonized would be the proper data on which to arrive at any just and equitable conclusion; £40 or £50 per annum for every 1000 tons of coal carbonized has been spoken of as the proper sum to pay the manager; but this is open to the objection that different coals in different localities yield such different results, that one might produce quite as much gas with 8000 tons as another with 10,000 would—in fact, do quite as much work, and yield quite as good results, and yet the one using the coal at the small yield would get £100 per year more than the other, without having an atom more work in nearly every particular, nor any more responsibility.

Again, the dividend has been argued by some as the proper data for regulating the manager's salary; but this is open to the serious objection that the dividends are often ruled by other circumstances than those of management. Some works are unfortunately situated. Some have much more capital than others in proportion to their yield. Some have been forced down by agitators to extremely low prices, and some have much less mileage of main. All these causes, and many more, may dictate differences of dividend quite apart from management, and it is unfair that the manager's salary should be ruled by circumstances quite beyond his control, and in some cases circumstances that were in existence before he was born.

Then, again, the quantity of gas manufactured is looked upon by others as a legitimate ground for calculation, and certainly this is nearer the mark than the other means that I have mentioned. Nearly every million feet of gas manufactured involves a certain amount of work, supervision, and forethought, and that very similar, too, under most circumstances; still there is the question of unaccounted-for gas to be considered, and the man who made the greatest saving on this point ought not to suffer in his salary by his saving for the company. I have known cases where the loss is 19 or 20 per cent., and others where it is only 5 or 6 per cent. Now the man who had the 20 per cent. would get 15 per cent. more money than the other, because he would have to manufacture that amount more of gas in order to meet his consumption, and this would certainly be an unfair thing.

From all this I cannot help thinking, if there are to be any data at all, the most fair is to take the amount of gas brought to charge as the basis. There may be objections to it, and I have no doubt there are; but still I think the objections are less than to some of the other means that have been adopted. At all events, the manager should receive the benefit of good results yielded to the company, let them be arrived at from whatever data they may. But, it may be asked, what can be the good of our sitting here and considering a question over which we have no control—a question that is one strictly for the directors, and about which they will do as they like? I answer—much good. I believe the grand difficulty with directors in regulating their officers salaries is the want of statistics and data. They do not want to overpay; but, as a rule, they are willing to pay a man for his attainments, qualifications, and work; and I believe it would be much easier for managers to acquire at their boards that which they are worth, when they can produce good sound evidence of the proper sum they ought to receive, than if it were all dependent upon the rule-of-thumb, and had to be decided by the judgment of those who have no means of adjusting that judgment, or of arriving at a proper conclusion. But this remuneration should, in all cases, be such as to lift the manager above the temptation of commissions. The "Commission Abolitionist," who wrote in *The Times* a week or two since, has opened the ball of this very dirty subject, and has accused nearly all the gas managers, as a body, of taking toll on everything that comes into the factories they manage; and it is for us to take the bull by the horns, and at once declare such a wholesale accusation to be a libel. I am proud to say that, so far as I am concerned, I can meet him and all his charges with much cleaner hands than he can meet me. He admits that he has made his business, to a great extent, by bribing, and then gets on the housetop to wash his hands before the public, because he now thinks he can manage to do without it. He can bribe or not bribe, as it pays him best; and the question of right and wrong is altogether eclipsed by that of profit and loss.

I believe with Mr. Livesey, who ably replied to the letter in question, that the first move in this dirty business generally comes from the manufacturer. The commercial man is anxious to increase his business, and all manner of arguments are used to carry out this object—certain winks, blinks, and pokes in the ribs are given, which are followed up with plainer terms, and if the manager be not a man of high moral rectitude, the business is done; but I am far from believing that these exceptions are few, as Mr. "Abolitionist" declares, for I have myself the pleasure of many personal friends, to whom I have from time to time talked on the subject, and who, I know, would not soil their hands, any more than I would myself, by accepting a commission on any business whatever that they did for the companies they represent.

What we want is not men who will mount the rostrum and condemn the system because they now think it pays them to do so, but men who have clean hands on the subject, and who will show their opinion because they feel it wrong—it matters not whether they are managers of gas-works or merchants who serve them—but they must be men of high moral rectitude, men who would rather work for a clean shilling than soil their pockets with a dirty guinea, and who will make their declaration because they feel it is a question of right and wrong, and not because they see it as a question of profit or loss.

Gentlemen, my task is done; it is hurriedly and poorly done, I know. I ask you to pass by its imperfections, and if there be nothing in it worthy your acceptance but this, I ask you to accept my hearty desire to serve you, and wish to have produced you a better and more appropriate address, if my ability, time, and health had permitted it.

A vote of thanks to the president was proposed and carried unanimously. It was also resolved that the address should be printed and distributed among the members.

ALDERSHOT GAS AND WATER COMPANY.—The half-yearly meeting of this company was held at their offices, Aldershot, on Wednesday, the 14th inst. —F. Eggar, Esq., in the chair. The directors recommended a dividend at the rate of 5 per cent. per annum, which was agreed to. The chairman, in the course of his address, stated that the increase in the consumption of both gas and water had been considerable, and that the new tank and gasholder just finished had turned out a most satisfactory job, and had been well conducted by all parties from beginning to end. The managers —Messrs. Wilson and Douglas—were the contractors for the excavation and building of the tank. Messrs. Cutler and Son erected the gasholder. Plans and specifications were furnished by Mr. A. F. Wilson, A.I.C.E. The proceedings terminated with the usual vote of thanks to the chairman, to the board, and to the honorary secretary.

KIDDERMINSTER GAS COMPANY.

The Hundred and Thirteenth Half-Yearly Meeting of Shareholders was held on Tuesday, the 6th inst.—Mr. J. KITELEY in the chair.

The following report of the directors was presented:—

The directors have pleasure in presenting to the shareholders the accounts of the past half year, showing a profit for that period of £1794 11s. 8d., which sum added to £993 13s., brought forward from the previous statement, makes £2788 4s. 8d. profit at present unappropriated.

The directors recommend that this amount should be applied as follows:—

In payment of dividend on original shares—viz., on £12,000, half year at 10 per cent. per annum, free of income-tax . .	£600	0	0
In payment of dividend on additional shares—viz., on £14,400, half year at 7 per cent. per annum, free of income-tax . .	504	0	0
In payment of interest on £3600 preference stock, half year at 5 per cent. per annum, free of income-tax	90	0	0
In augmentation of the reserve-fund	800	0	0
	£1994	0	0
To be carried forward to next half year	794	4	8
	£2788	4	8

Following the policy adopted in January, 1876, the directors desire that the consumers shall again participate in the benefit of the success which has attended the working of the year, and they propose, therefore, to make a further reduction in the prices to be charged for gas from and after Jan. 1, 1877, notice of which will be forthwith issued.

The retiring directors (who are eligible for re-election) are Joseph Kitely, Esq., Moses Knowles, Esq., and Richard Brewster, Esq. The shareholders will also have to elect another director to supply an existing vacancy at the board.

Profit and Loss Account, June 30 to Dec. 31, 1876.

Dr.				*Cr.*			
Coal carbonized	£3152	13	4	Gas produced.	£6107	13	6
Purifying materials	25	0	0	Residual products—viz.:			
Retorts, implements, and materials	339	8	6	Coke	827	4	3
Salaries and wages	1213	8	3	Tar and ammoniacal liquor.	520	1	11
Rates and taxes	227	7	4	Meter-rents	159	9	4
Interest on loans and bankers charges	204	11	1	Abatements	12	3	7
Stationery, stamps, and advertising	33	7	5				
Accountant's charges . . .	15	0	0				
Bad debts	15	2	6				
Depreciation of works and plant	400	0	0				
Depreciation of meters . . .	200	11	0				
Law charges	5	11	6				
Balance carried forward . .	1794	11	8				
	£7626	12	7		£7626	12	7
				Balance brought forward, being profit in six months .	£1794	11	8

The CHAIRMAN moved the adoption of the report, and in doing so said: I am glad to be able to congratulate the shareholders that we can, as a board of directors, appear before you with a report so satisfactory as the one now presented. You are aware that at the beginning of last year we thought it right, having a sufficient balance at our disposal, to reduce the price of gas, so as to give consumers a participation in the success attending the company; and we also, in addition to that, resolved to increase the illuminating power of the gas somewhat above the parliamentary standard, for the purpose of giving the fullest satisfaction to the consumers—which, I believe, has been the case. With regard to the quality of the gas we are now making, our collector informs me that he never hears the least complaint; but, on the other hand, the greatest satisfaction is expressed by consumers, both large and small, at the manner in which gas is now produced. That statement must be very satisfactory to the shareholders. I think you will also see another gratifying feature in the report which will give satisfaction, and that is that we have been enabled to carry from the earnings of the year a certain sum to the guarantee-fund. Until the last year or two we have been without a fund of that kind; but I am one of those who believe that a company should have some kind of backbone—something to fall back upon either in case of an accident, or in the event, as it may be, that we should be called upon to defend ourselves. I hope the shareholders will think the board of directors have done right in appropriating £800 this half year to the guarantee-fund, making the total amount £1500. Our limit is £3000, and I shall not be satisfied until we have that sum in hand. It is always the property of the shareholders, and it is always satisfactory to feel that we have a nest-egg of that kind in the background. In addition, we have thought it well to pursue the same policy which we did last year; and although we do not see our way clear—I do not think it is at all clear—that our profits this year will be equal to last year's, yet we have thought it right that the consumers should participate in the profits made by the company. Hence we have reduced the price of gas to the following charges:—Consumers under 50,000 feet per quarter, 3s. 6d. per 1000; consumers above 50,000 and under 250,000 on such quarter, 3s. 5d. per 1000; consumers above 250,000 per quarter, 3s. 3d. per 1000. I believe that will give great satisfaction to the consumers, and we hope that, by the increased consumption of gas (and we are building our calculations upon that hope), we may ultimately restore the balance which we shall lose by the reduction. That is our feeling in taking the steps we have. I can only say, in conclusion, that we have lately commenced a rather more expensive process in making our gas, by using a large quantity of cannel coal; and I think the improvement in the gas is manifest to every one. The whiteness and purity of the gas has become very much greater since we adopted that course, and the illuminating power of the gas has also been increased. Taking all things into consideration, I think the board of directors come before the shareholders with a very satisfactory report, and if you think so I call upon you to pass the resolution I have moved.

Mr. M. KNOWLES seconded the motion.

Mr. HARDING asked whether the increase of the concern was such as to make it desirable to increase the capital.

The CHAIRMAN thought not. He did not think they wanted any more capital at present. If they saw the town developing they would not like to be behind.

Mr. HARDING asked if there was any communication to make to the shareholders about the action of the Town Council of the borough for purchasing the works.

Mr. CARTWRIGHT thought it was not desirable that negotiations, which he understood were *sub judice*, should be made public just now.

The CHAIRMAN said he had anticipated such a question being asked, and he could not think that there would be any impropriety in stating what had been done in the matter, but not to state what the future intentions of the directors were. In reality nothing had been done in the matter. There had been one conference with some members of the Town Council, who were told that the directors had no desire to sell the works, but that they would be prepared to consider any fair and equitable offer the council might make.

Mr. CARTWRIGHT thought that the accounts presented were very satisfactory indeed. He was pleased to find that the directors had not only been able to give the full amount of dividend which the parliamentary powers enabled them to do, but that they were at the same time increasing the illuminating power of the gas, which must be very satisfactory to the district they supplied. He saw that the loans had exceeded their borrowing powers. He did not say that to cast the least reflection upon the board of directors, but he mentioned it with the view of calling attention to the fact. The share capital was £30,000, their further powers of borrowing were £6000, while the loans amounted to £8000. Whether that extra sum came from their bankers, or from the loan of a private gentleman, did not much matter. That was one element which the directors should bear in mind when they were discussing the reductions in the price of gas. As one who had had a good deal of experience in such works, and was familiar with many gas-works throughout the country, he was bound to say that he was of opinion that the public at large could be better served by the company than they ever would be by the corporation. He did not wish to make any critical remarks, as he was speaking in the presence of gentlemen who were, he understood, members of the corporation, but he was strongly of the opinion he had just expressed. The directors had proposed to reduce the price of their gas. Permit him to say that the price of gas supplied by the company was extremely low. He came from a district where coal was to be obtained 50 or 60 per cent. cheaper than they could get it at Kidderminster, and yet the price of gas in his district was just the same as that recommended to be charged by the directors. He thought when the public knew that fact they must be perfectly satisfied with the charges made, and would see that they were extremely moderate, and that when they got moderate price, combined with a good article, coupled with the fact that the concern was worked by practical men, engaged in the industry of the place, the public would be satisfied with the efforts of the directors.

The motion for the adoption of the report was put and carried, and on the motion of the CHAIRMAN, seconded by Mr. TALBOT, it was resolved—"That a dividend on the original shares, half year, at 10 per cent.; on the additional shares, half year, at 7 per cent.; and interest on preference stock, half year, at 5 per cent. per annum, be paid forthwith, free of income-tax."

The retiring directors were re-elected, and Mr. E. J. Morton was appointed to the vacant seat at the board.

Votes of thanks were given to the directors and chairman, and these having been acknowledged, the proceedings terminated.

BROMSGROVE GAS CONSUMERS COMPANY, LIMITED.

The Eighth Ordinary General Meeting of the Shareholders in this Company was held at the Town-Hall, Bromsgrove, on Monday, the 12th inst.—Mr. JEFFERIES, Chairman of the Board of Directors, presiding.

The report of the directors, read by Mr. JOHN T. KEY, secretary, was as follows:—

Your directors have great pleasure on this occasion in presenting to you their eighth annual report.

Your works and mains, with but few exceptions, are in excellent condition, and what repairs are required will be attended to in the usual way when the proper time arrives.

The balance-sheet and profit and loss account for the past year are before you, having been duly audited, and a copy placed in the hands of each shareholder; it will be noticed that there is an available balance of £918 0s. 8d., out of which it is proposed to make a dividend at the rate of 10 per cent. per annum, and a resolution to that effect will be proposed at this meeting.

In compliance with the Articles of Association, Messrs. Bennett and Saywell retire from the board of directors, but being eligible they offer themselves for re-election.

The auditor also offers himself for re-election.

In conclusion, your directors again assure you that their utmost endeavours will be to maintain your property and business in its present highly satisfactory condition.

Balance-Sheet, Dec. 31, 1876.

Dr.				*Cr.*			
5000 shares of £1 each, paid up	£5000	0	0	Works, mains, plant, land, and houses	£7933	9	6
1000 " " "	1000	0	0	Add Crescent main	25	3	0
1000 " " "	1000	0	0	Factory Lane main . . .	9	4	2
2000 " " "	2000	0	0	Preliminary expses.. £210 6 6			
Sundry trade creditors . . .	159	6	9	Deduct for this year's proportion . . . 50 6 6			
Reserve-fund	450	16	6		160	0	0
Add from profits of 1876 . .	18	0	8	Amounts owing to the company for gas, &c.	1020	0	1
Profit and loss for dividend .	906	0	0	Stock in hand—viz.:			
				Coals.	345	0	0
				Coke, tar, lime, &c. . . .	105	12	11
				Gas-fittings	365	18	3
				Stock of meters . £485 14 10			
				Less wear and tear 24 5 9			
					461	9	1
				Add meters purchased . . .	56	2	0
				Cash in bank	44	14	10
				Cash in office	1	10	1
	£10,528	3	11		£10,528	3	11

Profit and Loss Account.

Coals and haulage	£1173	12	2	Gas sold	£1948	11	7
Lime and haulage	48	5	5	Fittings	250	0	4
Gas-fittings	78	14	9	Coke, tar, lime, &c. . . .	546	1	1
Salaries and wages	423	7	6	Rent of meters	21	10	6
Rates and taxes	37	10	4	Rent of houses	22	8	0
Sundry tradesmen for repairs and maintenance of works, &c.	188	11	4	Extra stock	159	18	1
Wear and tear on meters . .	24	5	9	Interest	4	14	2
Proportion of preliminary expenses	50	6	6				
Bad and doubtful debts. . .	3	6	3				
Discounts and allowances . .	7	3	1				
Balance	918	0	8				
	£2953	3	9		£2953	3	9
Dividend	£900	0	0	Balance	£918	0	8
Reserve-fund	18	0	8				
	£918	0	8		£918	0	8

The CHAIRMAN, in moving the adoption of the report, stated that the directors had been induced to recommend the payment of the highest dividend allowed by law, by the consideration that the reserve-fund had nearly reached the maximum—namely, £500; that there was now ample capital to work the concern without borrowing of the bank; that no interest was allowed upon surplus at the bank, and that the works were in such an efficient state that there was no necessity, at any rate at present, to put by anything for depreciation, and, therefore, it was thought better to give the shareholders the benefit of the balance.

Mr. SAYWELL seconded the motion for the adoption of the report and statement of accounts, which was carried unanimously.

On the proposition of Mr. BENNETT, seconded by Mr. GREEN, it was resolved that a dividend as recommended in the report, and payable on and after the 1st of March, be made.

Mr. HUMPHREYS, a shareholder, called attention to the prospectus issued at the formation of the company, which stated that they would supply gas at a price not exceeding 4s. per 1000 feet, without charge for the use of meters. He thought many had supported the company on the strength of that promise; and looking at the accounts as issued, he was of opinion that the income would be sufficient to enable the directors this year to lower the price of gas to the sum named, and to pay 7½ per cent.

dividend to the shareholders. He therefore moved a resolution—"That this meeting respectfully request the directors, as from the 31st of December, 1876, to supply gas, according to the promise made in the prospectus of the company, at 4s. per 1000 feet."

Mr. ALLINSON, a shareholder, seconded the motion, which was carried.

The CHAIRMAN explained that when the promise was made, the directors were new to the business, and did not quite understand their position. It had been found necessary to increase the capital from £5000 to £9000, the price of coal had advanced from 11s. 6d. to as high as 23s. 6d., and it was now considerably dearer than it was when the company was formed, wages were higher, and the directors would never have power to reduce the price of the gas to 4s. till the consumption was much increased, or coal came down to its original price; nevertheless they would take into careful consideration the recommendation of the shareholders.

On the proposition of Mr. ALBERT, seconded by Mr. LEDBURY, the retiring directors were re-elected.

The thanks of the shareholders were voted to the chairman and board of directors for their continued attention to the interests of the company.

Mr. F. N. Gosling was re-elected as auditor of the company.

Pursuant to notice given, Mr. ALLINSON moved that the sum of £70 be taken from the profits of the year, and be divided, *pro ratâ*, amongst the directors, as remuneration to them for their services in the formation of the company.

Seconded by Mr. HUMPHREYS, and carried unanimously.

The CHAIRMAN returned thanks, and proposed that the best thanks of the directors and shareholders be given to Mr. Key, the secretary and manager, for his untiring energy and perseverance during the past year, which had placed the works in the highly satisfactory state in which they were. He said the directors had thorough confidence in Mr. Key, who was deserving of the best thanks of the company.

Mr. BENNETT seconded the proposition, which was carried unanimously, and duly acknowledged by Mr. KEY.

A vote of thanks having been passed to Mr. Gosling, the auditor, the meeting ended.

WIGAN CORPORATION GAS SUPPLY.

The following is the Report presented by Mr. HAWKINS, the Gas Manager, to the Corporation Gas Committee on the 2nd inst.:—

Gentlemen,—In compliance with your instructions, I have pleasure in making the following report, which I beg to submit to your consideration:—

Your works of distribution are unusually extensive—viz., from east to west a distance of nearly eight miles, and from north to south six miles, representing a total length of mains, without the works, of 93 miles, employed in the distribution of gas to a present population of less than 1000 persons per mile of mains, whereas generally the population of a manufacturing district like Wigan amounts to from 1500 to 2000 per mile of pipes.

The quantity of gas distributed during the half year ending the 31st of December last amounts to 97,766,000 cubic feet, or 1,051,190 cubic feet per mile of pipes laid down. The average in similar districts, for the same time, is from 2 to 2½ million cubic feet. Computing the population of Wigan and the district at 90,000 persons, the gas distributed is at the rate of 1086 cubic feet per head of population, a quantity also very much below the average in similar districts. The investment of capital in distributory plant is therefore unusually large, and the liability to a heavy leakage also proportionately increased. This, however, is the unavoidable consequence, partly of local peculiarities, and partly of the very liberal manner in which gas has been carried to all classes of the population, and to all parts of the district.

I have given considerable attention to the question of loss or leakage—*i.e.*, the difference between the amount of gas manufactured and registered by the station-meter at the works, and the aggregate of the gas registered by the consumers meters, and charged for in the rental. The per centage of gas unaccounted-for is in general a severe test of the good or bad management, and also the condition of the mains of a gas undertaking; and generally the average per centage of loss is found to be from 10 to 16 per cent. of the gas manufactured. The per centage of loss during the year ending the 31st of December, 1875, was 32 per cent. of the total quantity of gas manufactured. On my appointment as your gas engineer, eleven months ago, my attention was directed to the inadequate supply of gas to the district, and more particularly to the townships of Pemberton, Orrell, Upholland, and Standish. The testing of pressure and supply made at that time revealed the existence of a most unsatisfactory state of things. The greatest pressure obtained in the Pemberton district during the hours of consumption was very much below what it ought to have been, whilst in the other three districts—viz., Orrell, Upholland, and Standish, there was scarcely any indication of pressure at all. The question then arose as to what should be done to remedy this, and, acting upon my recommendation, your committee have since then laid out large sums of money in laying down larger and more suitable mains into those districts, as well as a leading main from the works to the centre of the town. The effect of these alterations has been that you are now not only in a position to furnish a proper and sufficient supply of gas to the whole district to meet the present and future requirements, but you are also enabled to do so with fully a third less working pressure at the works, thereby reducing the liability of leakage to a minimum.

In connexion with this subject I have also to remark that the rapid ascents and descents of the ground within the borough and district caused me to recommend you to divide your distributory plant into three separate sections. I am pleased to report to you that this work is now complete, and has just been brought into operation. We are now enabled by this means to regulate the pressure, and equalize the distribution with facility and exactness. The total length of new mains laid down during the past year amounts to nearly 9½ miles, and the sizes range from 20 inches to 3 inches. The number of new services laid on during the past quarter is 230. The number of old services replaced by new ones during the same time is 54.

In view of the rapid growth of the district, and the increase that was expected to arise in the consumption of gas, consequent upon a better supply to the district, the producing power at the works has also received the committee's anxious consideration and attention. During the past year the 14 old benches of seven, and the 20 benches of three retorts have all been removed and replaced by others contructed on a new and improved principle. The maximum number of retorts in operation at one time during the present season was 221, compared with 214 last year, and the quantity of gas manufactured and registered by the station-meter for the half year ending the 31st of December last year was 97,766,000 cubic feet, compared with 79,832,400 cubic feet for the corresponding period of 1875.

In connexion with this subject I would remind the committee that for a short time during last Christmas season the increase in the consumption of gas assumed such enormous proportions that, with the limited number of retorts at our disposal, we experienced very considerable difficulty in maintaining a sufficient supply to the district. The new benches of retorts about to be erected next spring should, therefore, be pushed forward as rapidly as possible.

During the past year you have erected two new exhausters, of improved make, each capable of exhausting 50,000 cubic feet of gas per hour. These are arranged in duplicate, and have taken the place of the two old ones formerly in use.

A gas exhauster is an apparatus employed for the purpose of relieving the retort from pressure or resistance offered to it during carbonization by the weight of the gasholders, purifiers, and other machinery. It is obvious, therefore, that without an apparatus of this kind the whole weight of the gasholders and the resistance offered by the purifying material, through which the gas has to pass to be purified, is thrown back upon the retorts, the effect of which would be a reduction of about 2000 cubic feet in the yield of gas for every ton of coal carbonized.

The old gasholder-tank, which last year was partly filled with rubbish, has now been cleaned out and arched over, and now forms an ample store for the tar and ammoniacal liquor manufactured at these works, the want of which must have been attended with enormous loss to the corporation.

Having carefully inquired into the cause of the increase that has shown itself in many of the consumers accounts for the past quarter, and in order that I may give you my opinion upon this important subject, I am reluctantly compelled to refer to the past management of your undertaking.

With the view of making this subject clearly understood, I will deal with the question of consumers meters, their construction and regular inspection, which undoubtedly forms one of the most important subjects which concern the prosperity of a gas undertaking. A meter is an instrument used for the purpose of determining the quantity of gas passed through it, and the quantity so determined is that for which the consumer is charged. It seldom happens, however, that we meet with a meter that will register exactly the quantity of gas sent through it, notwithstanding that every attention and care are given to its manufacture; but in order that gas-meters should be made to register within certain limits, the Sales of Gas Act was brought into force. By this Act every meter in use in the district must of necessity have passed through the hands of a Government inspector and been tested, and, as I said before, it seldom happened that we found a meter that would register absolutely correct; therefore, to meet this difficulty, the Act states that so long as any meter does not register more than 3 per cent. against the gas company, nor 2 per cent. against the consumer, that meter shall be considered correct, and the Government inspector is in duty bound to affix his seal to it as being a correct means of registration of gas within the meaning of that Act. This, then, is all that can be reasonably expected, both by the buyer and the seller of gas. In order, however, that gas-meters may continue to register correctly for any length of time, it is imperative that they should undergo a regular and systematic inspection, say once in each month; and if there happened to be found on inspection any meters not registering, or meters indicating an unusually large consumption, due to leakage or some other cause, the same could be immediately dealt with and put right.

To show how exceedingly important this matter is to owners of gas undertakings, we will suppose a certain meter to have been inspected to-day, and that it is now registering correctly, next week it may register 2 per cent. slow, the following week 4 per cent., the following week 8 per cent., and in a few more weeks it would cease to register at all. Still the supply of gas is kept up, the consumer experiences no difficulty with his gas, and in due course the account is presented, and he thinks when he is paying it he is paying for all the gas he has consumed, when in reality he has done nothing of the kind.

The number of meters in use at Bolton is 22,000; and to look after these there are employed eleven meter inspectors, whose duty it is to inspect the whole of the consumers meters in the district once in each month, and the mill meters every Monday. At Blackburn there are 14,791 meters in use, and for these there are eight meter inspectors, and the meters there are inspected the same as at Bolton. In Leeds there are 6d meter inspectors, and each has, on an average, 1800 meters entrusted to his care. The number of meters in Wigan is just under 9000, and to attend to these in a similar manner we should require at least five inspectors. What, then, can be said of the system of meter inspection in operation in Wigan previous to my appointment, when there was only one person to attend to the whole district, with the exception of the mills, and he, too, never did more than enter down the statements for the quarter's accounts, and it took him the whole of his time to do that, for as soon as he had got through the district once he had to begin again, so that, strickly speaking, there was no inspector at all. The so-called meter inspection, then, must, under such circumstances, have been simply a farce, and the quantity of gas appearing on the face of the accounts as having been consumed must of necessity have been entirely misleading and unreliable.

In confirmation of the extremely unsatisfactory manner in which this important work was attended to, I could refer you to scores of cases in your own books where meters have been known to stand for two, three, four, five, and even six years at a time without ever registering a single foot of gas, and the consumers accounts have all along been estimated. Well enough might many of the accounts be more now than they used to be in those days; the mistake is they were formerly too little, and a large portion of the gas which was charged to leakage actually passed through the consumers meters unregistered, and consequently was never paid for.

It is, then, to the more perfect system of meter inspection which has been brought about within the past two quarters that I attribute the increase in so many of the accounts. Of course the out-townships, as well as certain portions of the town, will be affected to a certain extent by the better supply afforded by the new pipes carried into those districts, and for which the consumers will no doubt make every allowance.

The per centage of loss, or gas unaccounted-for, during the half year ending the 31st of December last was 23 per cent. compared with 32 per cent. for the year 1875. The reduction is no doubt partly due to the larger mains recently laid down, enabling me to work at considerably less pressure than formerly.

In conclusion, I beg to say that apart from the interest I take as manager in making your undertaking a success, I have nevertheless fully considered the interests of the consumers at large; and, by way of recommendation, I would strongly advise them to pay greater attention to their fittings and burners, and also, and whenever gas is not required, to see that it is shut off at the main-tap, and in all cases whenever practicable to regulate the pressure at the meter. If the above recommendations are properly attended to, the result would be a great saving, and would help very materially to reduce the amounts charged to the consumers.

(Signed) J. G. HAWKINS, Engineer.

This report came before the Town Council at their meeting on the 7th inst.

The MAYOR also read the following copy of a resolution which he said he had been asked to present to the council, and which was adopted at a public meeting of ratepayers and gas consumers held on the previous Friday:—"That the ratepayers and gas consumers, being thoroughly dissatisfied with the very large increase in their gas bills, and believing that gas of an equal quality can be produced at a much less cost, respectfully solicit his worship the Mayor to lay before the council the following request, viz.: That an independent gas engineer, selected by gas consumers, be allowed to inspect the mode of working and the management of the gas-works, at as early a day as possible, that his report thereon may be published for the satisfaction and guidance of the gas consumers generally."

After a long discussion, the following resolution was adopted by the council:—"That, in compliance with the request of the ratepayers and gas consumers, permission be given for any gas engineer whom they may appoint to inspect the gas-works, and the mode of working the same, at any time, and that Mr. Hawkins be instructed to give him every facility for so doing."

MACCLESFIELD CORPORATION GAS-WORKS.

At the Quarterly Meeting of the Macclesfield Town Council, on the 7th inst., the minutes of the Gas Committee came up for approval.

Alderman STANCLIFFE (chairman of the Gas Committee), in moving their adoption, said that during the past quarter the illuminating power of the gas had averaged 17·9 candles. Owing, as the committee supposed, to the depressed state of trade, a decrease had taken place in the consumption for the half year of 5·08 per cent. The committee had completed the two new purifiers at a cost of about £909; they had also completed a stable at a cost of about £330. In course of time they intended to furnish the stable and cart-house, as they thought it would be an advantage to have their own horses and carts, for many reasons. For instance, they had paid during the quarter the sum of £107 for carting; further, if they had horses and carts at their own disposal, they would be able to sell and deliver coke to customers in the town; as it was, they had to sacrifice a good deal in price, as the townspeople would not buy the coke unless it was delivered, and the committee had to sell it out of the town at a reduced price. They were anticipating other improvements and additions to the cost of about £1200. They wanted a new scrubber and a new condenser, at a cost of about £1000; if they had these the result would be satisfactory to consumers as to purification. So far as renewals were concerned, they had, as was customary, to undertake the refitting of three beds of retorts at a cost of about £200, and they also thought of putting up a new governor and pipe-house. The present governor was much the worse for wear, and they anticipated having £300 to spend there. The total anticipated expenditure amounted to £1400 or £1500. They hoped not to have to ask the council for any money, because if they did they knew they would be politely told to take it out of their profits. He had no doubt that if the committee were able to carry out the improvements contemplated they would have a good deal to add to the capital account through the further completeness and productiveness of the works.

Mr. HORDERN seconded the adoption of the committee's proceedings.

Alderman WHITE wished to call the attention of the council to the manner in which the gas profits were disposed of. The corporation had been in possession of the gas-works for nearly 16 years, and yet up to the present moment not a single penny from the gas profits had been devoted towards reducing the burdens of the ratepayers. Not only so, but he was prepared to prove that the gas-works so far from having been a profit to the ratepayers had been an additional burden. Why were the works purchased by the corporation? Surely not for the benefit of the gas consumers.

They were but a section of the ratepayers. He apprehended they were purchased for a twofold reason—first, to supply gas consumers with a good article at a moderate cost; and secondly, that the profits might be handed over to the borough-fund to lessen the rates. But had those objects been realized? So far as the quality and prices were concerned, he had nothing to say; he would leave that with the consumers; but it was certain that the second object had not been gained, for no benefit had as yet been derived by the ratepayers. During the 16 years that the gas-works had been in the possession of the corporation, about £22,000 profit had been realized, and that amount had been spent in addition to ordinary wear and tear, in adding to the capital, and in the improvement and extension of the works. This amount of £22,000 was equal to the amount available from the general district rate for improvements in the borough, and for sanitary and other purposes, during the last 20 years. It was high time that some portion of the profits should go towards lessening the general claims on the ratepayers. He wanted to know when the large expenditure of profits was to stop. He remembered that when Alderman Carr was mayor, the council had presented to them an elaborate scheme for the extension of the works, and if such a plan as that had to be carried out, even in piecemeal, some considerable time must elapse before the ratepayers would begin to receive any benefit. The present generation had as much right to benefit from the possession of the gas-works as any future generation. There could be no doubt that when the extension of the works was completed they would be the source of a very handsome revenue. They were at present; but that revenue would increase, and when the continuous outlay upon the works had ceased, these very handsome profits, or a large proportion of them, would go to lessen the general rates. But they would fall to a future generation. Therefore he again asked—How long was this heavy expenditure of profits to be continued, and had not the present generation as much right to a share of the profits as those who came after them? He would say nothing as to the management of the works; they might be very admirably managed; no doubt they were. He said nothing as to the price of gas or the quality; he said nothing whatever as to the amount of profits; he spoke only of the manner in which those profits were disposed of, and he thought it high time that the committee stayed their hands. If they sought to increase their works, let them borrow money as other committees had to do. He hoped that by the close of the present financial year, and in making arrangements for the coming year, the committee would be enabled to let the ratepayers participate to the extent at least of £1000. Last year the actual profit was £3300, and not a shilling found its way into the pockets of the ratepayers. If the alterations and extensions could not be carried out so quickly as the committee required, let them be spread over a longer period of time, and let the money be borrowed, but do not let them go on spending that portion of the income which should go towards lessening the burdens of the ratepayers.

The Town-Clerk, in answer to Mr. Fowler, said the corporation had no further borrowing powers in connexion with the gas-works.

Alderman Stancliffe, replying to Alderman White, said he was not aware how long it would be before the committee ceased doing repairs and enlargements. He could only say that so long as they found their business required extensions, so long, he being chairman of the committee, they would continue to increase them. If the council did not repose confidence in their management he would be happy to give it up to some one more able; but they might depend on one thing—the committee would not spend one penny which they were not compelled to spend for the benefit of the town. He had not been chairman of the committee very long, he had nothing to do with the purchase of the works, he found them as they were, and he took the management to do with them as he thought was best under present circumstances, and work them as he would do if it was his own private business. And what had been done would, he believed, give satisfaction to any one who chose to examine them. They were, he believed, working on a better basis than formerly, and it mattered little to the committee whether they gave up the whole of the profits or a part of them; if the works were to be increased there must be means found for increasing them. So far as the profits were concerned, he was now in a position to inform Alderman White that the balance in their favour at the bank was £629 19s. 7d. The committee would be glad to hand over £1000 a year to the council, and would do so if it was their wish, but he would like to get a little straighter first at the works.

The Town-Clerk, replying to Alderman Wadsworth, said the gas profits could not be appropriated at the present time, as suggested. The provisions of the Act were that the profits must be applied (1) in paying the costs, charges, and expenses of applying for and passing the Act; (2) in paying any sums payable by the local board in respect of any contract for lighting the streets, &c.; (3) in paying the interest on all moneys borrowed by the local board under the powers of the Act; (4) in paying off mortgages by instalments, and in appropriating a sinking-fund for the payment of mortgages, &c.; (5) in constructing the works, &c., and improving, altering, enlarging, and extending the same; (6) for maintaining and extending the gas-works, pipes, &c.; (7) in repaying any money borrowed under the general district rate under the powers of the Act; (8) in paying off all principal moneys borrowed by the local board under the powers of the Act; and, lastly, in reduction of the gas-rents, lighting rates, and general rates authorized to be levied, or of such of them as the local board may from time to time direct.

Alderman Carr said the statement of Alderman White might be pleasing to the ratepayers and to the gas consumers, but the council were aware of the difficulties which the Gas Committee had had to encounter. One thing was clear, the works were bought at one-half too much money. They were rotten, used-up works at the time they came into their possession, and it had been a labour from time to time to make them available for the requirements of the town. He had, in conjunction with others, been instrumental a few years ago in placing before the council an elaborate scheme for getting the concern into good working order. He congratulated Alderman Stancliffe and his committee on having carried out that scheme as far as they could. As the town-clerk said, they had no borrowing powers in connexion with the gas-works; and the committee were doing that which was legal in appropriating the profits, because they had no other means at hand for keeping up the efficiency of the works, for the council had failed to establish what the Act said they should do—a sinking fund, which would take a considerable fund out of the revenue. Alderman White must bear in mind that it was not the enjoyment of things in their own lifetime that they all look to. There was nothing so pleasing to many of them as to look forward, on leaving this world, to giving their children a nice legacy, and in their last days they reflected with considerable pleasure that they were benefiting, or would benefit, those who were to succeed them. In lower gas-rates the town had been advantaged to a considerable degree. The illuminating power, previous to the purchase of the works, could never be more than 12 or 13 candles, whereas now it was 17·9. The Act prescribed that it should be 18 candles, but let them notice the difference between the present supply and that under the old company; the difference in quality compared with price made the difference of all the profit. He gave full credit to the present committee for endeavouring to put the works upon a sound footing, They all knew that there was nothing in which repairs were so much required as in gas-works; they required continuous outlay year after year, and the present committee had made that outlay judiciously.

The Town-Clerk, in answer to a further question, said the council had already borrowed money to the extent of the amount required to purchase the works—£49,000. This was all they were authorized to do; if they wanted to go beyond that, they must apply to the proper authorities.

Mr. Bower said if the works were purchased at more than their value, as stated by Alderman Carr, it was strange that the council should have made so much profit out of them. They had spent large sums out of profits in extensions and improvements at the works, and had handed over £10,000 towards building the town-hall.

Alderman Jackson said the fact was they had only the power to borrow or to pay £49,000 for these works; they cost £50,000. The Board of Health lent them £1000, and they had paid that off. They were bound by the Act of Parliament. When he was a member of the Gas Committee, he said—but he stood alone, and could not carry it—"Let us reduce the number of the bondholders." If they had acted upon that principle they might by this time have reduced the debt due to the bondholders by £10,000 or £20,000, and accordingly reduced the amount payable for interest. The fact of the matter was this—they wanted a new Act altogether; because, when they had paid the bondholders off, what were they to do with the profits? Were they to give the gas away? As to paying as much again for the works as they ought to have paid—well, it was a regular fight before a committee of the House of Commons; it was a battle fairly fought, and the fact was simply this—they paid what they were compelled to pay, and if they had not been compelled they would not have paid it.

Alderman Clarke said there was one thing which was very generally lost sight of when they considered this question. If they went into the open market to obtain gas shares, they might purchase them to pay 6 per cent.; 6 per cent. on £50,000 was £3000; but the superior credit of the corporation enabled them to borrow at 4 per cent., which was £2000 on £50,000, so that there was a difference of £1000 saving as between the ordinary 6 per cent. and the superior credit of the corporation. Looking at it in this light, they had £1000 year of a saving, due to their superior credit, which might fairly be applied to a sinking-fund, and they could enjoy the surplus profit. As to the financial aspect, he was glad to hear that the town-clerk had thrown upon it some new light—viz., that application might be made through the Board of Health, so that money might be borrowed, and the extension of the works might very properly be carried out with the newly formed capital at a low rate of interest. If that were done, they might, at an earlier date than had been hoped for, arrive at that state of things which Alderman White was anxious to see brought about. The ventilation he had given the subject might, perhaps, be the means of enabling the council to look at the matter in another light.

In reply to Mr. Barker, the Town-Clerk stated that the bondholders had received the necessary notice, so that the corporation could at once reduce the amount of their indebtedness when they were in a position to do so.

Mr. Barker concurred with Alderman Jackson, that whether they paid too much or not for the gas-works, the price was arrived at after a fair contest. It had apparently been forgotten that £3000 or £4000 had been spent in obtaining the Act, and that had to be paid out of future profits. He would be glad to see an arrangement whereby they would be enabled to appropriate something towards the rates of the borough, but that could only be done by Act of Parliament; and he did not consider that any necessity had yet been shown for enlarging their powers. The works were admirably managed, they had power to extend them out of the profits, and they were enabled to borrow temporarily from the treasurer for the purpose.

Alderman Clarke remarked, with reference to the large price paid for the works, that there had been something more than the mere plant to purchase; there was the valuable goodwill and an increasing estate. That was the reason they had to give so large a price. In the neighbouring town of Warrington, they had just agreed to take over gas-works at a cost of £155,000; and, looking at the price given for the Macclesfield works, in comparison, they appeared very cheap.

Alderman Bullock remarked that no doubt they ought to have provided a sinking-fund; but if they had appropriated the profits, as Alderman Jackson recommended, to paying off the bondholders as the profits arose, without extending the works as circumstances required, what would have been their position at the present time? They would have been in a state of utter darkness; they could not have carried out the lighting of the town with the old works.

Alderman Jackson said they commenced with a debt of £50,000, and they had to improve the works to make a capital; they did so, and in addition to what was requisite and necessary, they realized profits; it was these profits, independent of the improvement of the works, which he proposed should go to reduce the amount owing to the bondholders.

Mr. Smale thought that there was a way out of the difficulty, so far as the ratepayers were concerned, without the necessity of applying for further powers. Could not the Gas Committee give the gas, or supply it to the public lamps, at a lower price than they supplied it to the general consumers? The ratepayers could be relieved in that way.

Mr. Hordern thought it nonsense to talk of increasing their borrowing powers for the gas-works under present circumstances. The greatest part of the improvements had been entered upon and completed; and if the council would allow the committee to go on as they were doing for another year or so, they would get the gas-works in the condition they required. In a few years—perhaps in two—they would get the works in such a state that there would be a greater accumulation of profits, which could then be appropriated legally.

After some remarks by Alderman White in reply,

The motion for the adoption of the report was put and carried.

West Bromwich Gas Supply.—The six months, limited by the West Bromwich Improvement Act, 1876, as the time within which the Commissioners might agree with the Corporation of Birmingham for the purchase of that portion of the late Staffordshire Company's gas undertaking which is situate in the district of the board, having expired, the commissioners at their meeting on the 14th inst., accepted the recommendation of their committee, and appointed Mr. Bramwell to act as arbitrator in the matter on their behalf.

Chatham and Rochester Gas Company.—The half-yearly meeting of shareholders was held on the 8th inst.—Mr. E. Winch in the chair. The directors report stated that the whole of the company's works at Rochester and Gillingham were in a satisfactory state. A new retort-house had been completed, and erected in such a position as to render it secure against any irruption from the high tides. The directors recommended the payment of a dividend at the rate of 10 per cent. per annum on the shares, and dividends of 7 per cent. on the other shares. The report was unanimously adopted, and Mr. J. L. Levy, the retiring director, and Mr. T. S. King, the retiring auditor, were both re-elected, the usual vote of thanks being given to the directors.

HALIFAX CORPORATION GAS-WORKS.

The Quarterly Meeting of the Halifax Town Council was held on Wednesday, the 7th inst.—the MAYOR (Alderman Whitley) presiding.

The Gas Committee reported that the quantity of gas made during the quarter had been 106,005,000 cubic feet, as against 102,605,000 cubic feet for the corresponding quarter of last year, being an increase of 3,400,000 cubic feet. The quantity of cannel used had been 2178 tons, as against 2870 tons; the quantity of coal had been 8057 tons, as against 7580 tons. Total quantity of cannel and coal used 10,235 as against 10,450 tons in the corresponding quarter, showing a decrease of 215 tons. Wages paid during present quarter £2239 2s. 4d., as against £2145 19s. 6d.; increase, £93 2s. 10d. The average illuminating power had been 17·81 sperm candles, as against 17·4 corresponding quarter of last year; an increase of 0·41 sperm candles. The time had arrived when the committee felt it their duty to prepare for extending the plant. At present, with every retort in full working condition (and they could not all be depended upon), the maximum producing power was only 1,683,500 cubic feet per day; last winter the heaviest daily consumption was 1,594,000 cubic feet. This winter it had been 1,737,000 cubic feet; if next winter should increase at a similar rate, the heaviest day's consumption would be 1,892,000 cubic feet. Should there be three or four dark days, even with the Sunday stock to commence with, the town would be in darkness. The committee accordingly submitted a scheme, prepared by Mr. Carr, the manager, for extending and developing the gas-works. This had been affirmed by the committee, and provided for the production of 1,400,000 cubic feet of gas per day, in addition to the present power. The total capacity, with the proposed addition, would be 3,000,000 cubic feet per day.

The scheme was approved.

Mr. SHAW called attention to complaints as to cutting off gas services.

Alderman CROSSLEY said every precaution was taken by the Finance Committee to see that in no case was the gas cut off except where due application had been made for payment and the full time had elapsed. There might be one or two exceptional cases in which there had been an oversight, but the greatest pains were taken to avoid such.

Mr. SCARBOROUGH called attention to the serious neglect on the part of large numbers to pay their gas accounts. On the 25th of December, there were 5000 accounts unpaid. One gentleman in a principal street of the town had been waited upon several times, but he abused the man most abominably, and told him they might summon him or do what they liked. That gentleman had his gas cut off. He would treat all persons in that way who abused the officers of the corporation. The committee wanted the money, for they were owing to the bank something like £15,000 on the gas-works account.

The MAYOR, in reply to Mr. Pollard, said it was not obligatory on the collectors to call a second time, though they frequently did call a second and a third time. It was stated distinctly on the note that if the account was not paid on delivery, it was to be paid at the town-hall. If the collectors were to be expected to go twice, the staff would certainly have to be increased.

THE SEWAGE QUESTION.

The Ninth Ordinary Meeting of the Institution of Civil Engineers, for the Session 1876-1877, was held on Tuesday, Feb. 6—Mr. G. R. STEPHENSON, President, in the chair. The paper read was on "The Sewage Question," by Mr. C. Norman Bazalgette.

The object of this communication was stated to be twofold. First, to limit and define the proper application of the various systems introduced from time to time for dealing with the sewage of towns. Secondly, to direct attention to certain subordinate questions arising upon the practical operation of such systems. For the purposes of this paper the following classification had been adopted:—1. Treatment with chemicals; 2. Application of sewage to land, including irrigation and intermittent downward filtration; 3. The dry-earth system; 4. The Liernur or pneumatic system; and 5. Seaboard and tidal outfalls.

1. *Treatment with Chemicals.*—In this section of the paper, reference was made, in considerable detail, to the practical experience of the lime process at Leicester, Tottenham, Blackburn, and Birmingham; the A. B. C. process at Leicester, Leamington, Crossness, Hastings, Southampton, Bolton and Leeds; the sulphate of alumina process at Coventry; the phosphate of alumina process at Tottenham, Barking, and Hertford; Goodall's process at Leeds; Bird's process at Cheltenham and Stroud; Dugald Campbell's process at Battersea; and Whitthread's process at Tottenham. It was stated, generally, that the experience of these processes was more or less identical with that which had been derived from Holden's, Hillé's, Lenks', Suvern's, Scott's, and, in fact, all other methods in which, by the admixture of chemicals, it was sought to effect the purification of sewage by the precipitation of the dissolved and suspended impurities, and the ultimate realization of the precipitate in the form of a manure. This experience, coupled with certain opinions of Professor Frankland, Mr. Krepp, and Dr. Corfield which were cited, was relied upon as establishing the following conclusions:—That no chemical process could efficiently deal single-handed with sewage, but must be assisted by subsequent natural or artificial filtration of the treated sewage, and therefore no chemical process, *per se*, should be adopted for the purification of town sewage. The principal objections to chemical processes, which appeared upon the experience of the places where they had been adopted, and upon which this conclusion was founded, were, inefficiency of treatment, cost of treatment, and difficulty of manipulating the accumulations of sewage sludge.

2. *Application of Sewage to Land.*—The author first considered whether sewage could be made to yield an agricultural profit. The parliamentary return of 1873 was referred to, and the financial position of the Warwick farm was specifically examined. The question was also raised, whether sewage possessed any fertilizing value beyond ordinary water for the purposes of irrigation, and the experience of the Barking farm having been appealed to upon this point, the conclusion was laid down, that no profit ought to be expected from the cultivation of crops by sewage irrigation. The next point discussed was whether any definite standard could be laid down as to the proportion population should bear to acreage in the practice of irrigation, the proportions exhibited by eleven towns being referred to, and it was determined that it was impossible to frame a specific rule. The theory of intermittent downward filtration was then investigated, as based upon the laboratory experiments of the Rivers Pollution Commissioners; and it was argued that the proportions which they had affirmed population might bear to acreage, ranging in the case of one acre drained 6 feet deep from 2000 to 3300 persons to the acre, were too high, and were not justified by the experiments. The practice of downward filtration at Merthyr was next referred to, and it was shown that the extent of its practical operation there had been exaggerated, and that the results confuted instead of confirming the proportions of the Rivers Pollution Commissioners. The experience of Walton and of Kendal was also reviewed, and the following general conclusion completed this section of the paper:—That where land could be acquired at a reasonable rate, irrigation was the best and most satisfactory known system for the disposal of sewage, but that intermittent downward filtration might be practised where the necessary surface area for broad irrigation could not be obtained. Experience, however, showed that the permanent proportion of population to acreage, where land was drained 6 feet deep, should in no case exceed 500 or 600 persons to an acre.

3. *The Dry-Earth System.*—The applicability of this system to towns was next considered, and it was shown that it must be supplementary to, and not substitutive of, a water-carriage system, thus enormously increasing the cost of making sanitary provision for towns. The effect of its introduction into the Metropolis, as a test case, was illustrated by figures, to prove that it would be superfluous, costly, cumbrous, and impracticable. Indeed its applicability became diminished in the inverse ratio to the increase of the population to which it was proposed to apply it; and though it might be occasionally used with advantage in hamlets or detached buildings and institutions, it was unsuitable for the wants of towns.

4. *The Liernur or Pneumatic System.*—A description of the mechanical characteristics of this system was first given, and then the experience yielded by its operation at Leyden, Amsterdam, and Dordrecht was specifically analyzed. It was supplementary to, and not substitutive of, a water-carriage system, extremely costly, and its mechanism was complicated and liable to get out of order. The accumulation of sewage residuum in the central reservoir, and its subsequent decanting into barrels, were operations which could not fail to be objectionable and offensive. Its appliances were, therefore, not suitable for a high-class community, and no return from the manufacture of "poudrette" could be expected. In conclusion, it was urged that the system was of such a character that, though it might have a partial province in the tide-locked cities of the Hague, where no system of sewerage was available, it should never be imported into an English town.

5. *Seaboard and Tidal Outfalls.*—The first point considered was the return of the sewage of seaboard towns upon the beach; and it was maintained that where care had been taken to determine, by float observations, the force and set of the currents to which the sewage was to be committed, there was no difficulty in preventing such a result. The sea constituted the most natural and economical outfall for the sewage of towns situated upon it, and such means of outfall should be adopted. With regard to sewage outfalls upon the tidal portions and estuaries of rivers, there ought to be, arguing from the experience of the metropolitan outfalls, and assuming that proper precautions were taken in the selection of the outfall, and the exclusion of silt from the sewers, no danger of the silting up of the navigable channel.

PARTICK, HILLHEAD, AND MARYHILL GAS COMPANY.

FIFTH ANNUAL FESTIVAL OF EMPLOYÉS.

As mentioned in our "Trade Notes from Scotland" last week, this festival took place on the 9th inst.—JAMES HISLOP, Esq., in the chair. There was a large attendance, and on the platform Provost Shaw, Maryhill; Provost Cowan, Hillhead; Rev. J. M. Rae, Maryhill; Mr. Wilson, town-clerk of Hillhead; Mr. M'Gilchrist, Dumbarton; Mr. M'Leod, Glasgow; and Mr. Crawford, Partick, &c.

The CHAIRMAN, in his opening address, said: It is now nearly five years and a quarter since I cut the first turf towards the formation of the company's works, and four years last Christmas we began to make and send out gas from them. While the erection of the works was being pressed forward, the laying of main-pipes was also prosecuted with the utmost vigour, and, by the time the works were ready for the production of gas, we had upwards of 32 miles of mains laid down. Now we have upwards of 70 miles of piping, of sizes varying from 2 inches to 30 inches diameter. At the outset of these our operations, many were the conjectures that emanated from the people far and near, and considerable interest was felt in the future success of the undertaking. I myself never entertained a single doubt as to the success of the company. With a staff of men acting unitedly, cordially, and perseveringly, as has been the case, the company could not, nor can they fail to rise; yet, possibly, not so rapidly as some of the shareholders would wish. "Slow, but sure," is a good maxim, or, in the words of the good old Scotch song by Mr. Balantyne, of Edinburgh, to the bairnie, "Creep before ye gang." It is now 60 years since gas was first supplied in Glasgow, and I do believe, from that time, no gas company could have had a worse start than this one. Gas coal was selling at three times the ordinary rates, and every other thing necessary for a gas-works in the same proportion. When the works were completed so far as to admit of gas being made, the company were very much in the position of a person opening a shop, who knew of only a few would-be customers; but quality and cheapness of the article offered to an enlightened public cannot fail to command, in every trade, pre-eminence, and that is the secret of this company's success. It is the determination of the directors to maintain a supply of pure gas of high quality. I say pure gas, free from sulphuret of carbon. This is a most important consideration, as, if it is allowed to be produced in the manufacture, it cannot be removed by purification, and sulphurous acid is generated during the combustion of the gas in dwellings; the atmosphere therein soon becomes loaded with it, and the result is sure to be an increased death-rate from pulmonary disease, more especially in densely-populated places, where crowds of human beings are huddled together in small compartments, with low ceilings and bad ventilation. Well, the result of our supplying a good, pure, and cheap gas is, that in four years time the business of the company has risen from zero to over 100 million cubic feet in the past year; and, as the rate of increase annually is now upwards of 20 per cent., we may expect that, within the next five years, the demands will be over 200 million cubic feet. When the works shall have been extended in accordance with the plans, having 400 retorts, and allowing 20 per cent. for reserve, the manufacturing power will be three million cubic feet in the 24 hours. Our main-pipes stretch over an area of over 4000 square acres, and should the building operations continue in the future as in the past, the time is not far distant when even this large productive power will be exhausted. Take for an example the Maryhill and New Kilpatrick districts, the goodwill of which the company took over with the old company's works, in June, 1872. The gas sales then amounted to only about 4½ millions in the year, while in the present year they are nearly four times that quantity, and in the course of three years will have doubled again. During the existence of this company, many schemes have been patented to supersede the ordinary process of gas-making—*i.e.*, by some peculiar craft, it may be "witchcraft," to squeeze more gas out of a ton of coal than it in reality contains—such as Mr. Malam's and Dr. Eveleigh's patented processes. Yet another edition is going on nearer to us at the present moment, and the gas produced, as one party said, were it made any heavier it would not burn. Yet it is only 30-candle power. I am afraid they must be trying the plan suggested by a correspondent of the *Daily Mail*, some years ago—that of putting the candles into the gas, and the heavy wicks will be getting up into the jets. I look upon all these schemes as a farce, something like 20 shillings and 240 pence; what are they when compared to the standard? Only a pound. I believe our system is based upon sound principles; it inherits a firm constitution, and we may go on rejoicing without any fear of substitution. I trust all of you will endeavour to comport yourselves in a manly way, applying every effort, steadily and perseveringly, to duty, throughout this year as in the past years; or, in the words of one of Scotland's greatest heroes—Lord Clyde (who was born

at Glasgow in 1792, the year in which the first gas-works were erected)—to the "thin red line" on the heights of Kamora, before Balaklava: "Be steady men and do your duty," and shortly the company will rise up and rank with the first in the nation.

Addresses were also delivered by the Rev. Mr. Rae and others. The musical part of the programme was ably sustained by Mrs. R. Fraser, and Messrs. M. Hamilton, R. Bryan, R. Cunningham, and R. Fraser. The proceedings were most enjoyable throughout.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

It has just transpired that the Police Commissioners of Partick, one of the burghs in the suburbs of Glasgow, have got the sum of £100 16s. to pay as their share of the parliamentary expenses incurred in connexion with Sir Windham Anstruther's Gas Bill. This fact turns out to be rather a surprise to some of the Partick ratepayers.

At a police court held at Macduff last Wednesday, before Provost Martin and Messrs. Simpson and Bow, police magistrates, John Scott, architect, Macduff, was sentenced to pay a fine of £2, or undergo thirty days imprisonment, for stealing gas. He had made a connexion with the supply-pipe prior to its attachment with the meter.

The managing committee of the Gas Corporation of Arbroath met last Wednesday night, when there was brought under the consideration of the members the price charged to consumers for the use of meters. It was found to be unequal, and the meeting resolved to make a uniform charge of 7½ per cent, which is to begin with the financial year.

The last report by Mr. J. Falconer King, public analyst, on the illuminating power of the gas supplied by the Edinburgh Gas Company, sets it down at 30·32 candles, while that of the Leith Gas Company at the same time was 28·07 candles.

Grumbling regarding the quality of gas seems now to be showing itself at Helensburgh, and yet according to the annual report just issued by the West of Scotland Association of Gas Managers the illuminating power is not less than 30 candles.

Referring again to that report, I find that last year's make of gas was 6¼ million cubic feet, while in the year 1873 it was only 5 million feet. Then, again, the leakage, or gas unaccounted-for, has been reduced from 30 per cent. to 10 per cent., and the price has fallen from 8s. 4d. to 5s. per 1000 cubic feet. Lastly, the meter-rent is now 1s. 6d. per annum, whereas in 1873 it ranged from 2s. upwards, according to size. The foregoing figures show that a most salutary change has taken place since the opposition company ceased to exist.

At a special meeting of the Grangemouth Burgh Commissioners, held last Friday, a letter was read from the Public Works Loan Commissioners agreeing to lend £11,200 for the completion of the new water-works, only £10,000 to be paid in the present financial year.

The Bonhill Local Authority met last Tuesday to consider the proposed water supply for Jamestown district, Vale of Leven, Dumbartonshire. A statement by Messrs. R. Young and Son, engineers, showed that the available supply would be from 18,000 to 20,000 gallons, and the cost fully £800, exclusive of compensation. The matter was remitted to a committee with full powers.

It has been resolved to impose three different water-rates in Cupar—viz.: (1) a rate on owners at 6d. in the pound of rental, yielding £400; (2) an occupation-rate for property other than dwelling-houses, at 1s. in the pound, yielding £300; and (3) a domestic rate of 1s. 10d. in the pound, yielding £916. It is expected that the rates will be reduced to 5d., 10d., and 1s. 6d. respectively next year, and that there may even be a further reduction in future years. The sum of £25,000 which was allowed by the Act of Parliament will, it is believed, cover all the expenses.

The Public Works Loan Commissioners have intimated to the Crieff Police Commissioners that they are prepared to advance the sum of £3500 on the drainage works which it is proposed to execute in the burgh. The conditions are—3¾ per cent. interest, or, including capital and interest, £4 17s. 5s. per cent., making in the latter case an annual payment of about £175 for 39 years, any remaining balance to be paid at the end of the fortieth year.

The pig iron market has been rather weak in tone during the past week. Business was done on Friday at 56s. 5d. and 56s. 4d. cash, the week thus closing with prices 3d. under the closing quotations of the preceding week. Shipping iron is getting into somewhat better demand. Manufactured iron is in good request, and the mills are generally well employed, but the order-books are not so well filled ahead as they were.

Owing to the increased mildness of the weather the demand for coal has lessened to such an extent, that some descriptions are almost at a standstill. Prices for immediate orders are easier. Wishaw Main coal, free on board at Glasgow Harbour cranes, is quoted at 6s. 9d. to 7s. 3d. per ton; house coal at 7s. 9d. to 10s.; splint coal at 8s. to 8s. 6d.; steam coal at 9s. to 10s. 3d.; and smithy coal at 14s.

WHITBY WATER-WORKS COMPANY.—At the meeting of shareholders on the 7th inst., a dividend of 9½ per cent. per annum on the paid-up capital of the company was declared.

REDUCTION IN THE PRICE OF GAS.—At the meeting of the Congleton Town Council on the 7th inst., the Gas Committee recommended, and the Corporation agreed to, a reduction in the price of gas from 4s. 6d. to 4s. 2d. per 1000 cubic feet.

GLASGOW WATER SUPPLY.—Dr. Mills, F.R.S., of the Andersonian University, Glasgow, reports that the water supplied to that city from Loch Katrine during January was "very pale brown, and decidedly ferruginous, and contained a considerable number of muddy articles and some fibres."

BIRMINGHAM WATER SUPPLY.—Dr. Hill, the Medical Officer of Health, reports that the water supplied to that town during last month was "turbid and yellowish, and contained an increased quantity of organic carbon and nitrogen. The late heavy rains are doubtless the chief cause of this greater organic pollution."

BASINGSTOKE WATER-WORKS COMPANY, LIMITED.—The annual meeting was held on the 5th inst. The report of the directors stated that the net profits for the year amounted to £365 2s., and after expending the sum of £30 8s. 1d. in laying new services, there was an available balance of £334 13s. 11d. The directors recommended that a dividend of 9 per cent. be declared, which would absorb £315, carrying the balance to the reserve-fund, which would amount to £75 19s. 9d. The report was adopted.

MELTON MOWBRAY GAS COMPANY.—The half-yearly meeting was held on the 10th inst., when a dividend of 20s. per share for the half year ending the 31st of December was declared. An extraordinary special meeting was held at the same time, at which it was decided to increase the capital of the company by creating 300 new shares to be called A shares, the first call to be made on the 1st of July in the present year. The resolution was unanimously agreed to, and the preliminary steps taken for putting the decision of the meeting into effect.

HULL GAS SUPPLY.—Mr. James Baynes reports that the gas sent into the district of Sculcoates and Myton during the month of January by the British Gas Company gave the following results, free ammonia and sulphuretted hydrogen being at no time present to the ordinary test:—

	Max.		Min.		Mean.
Illuminating power standard sperm candles	16·70	..	15·50	..	16·01
Grains of sulphur per 100 feet	31·40	..	27·50	..	29·60

Mean barometer and temperature in experiment-room:—Bar., 29·65; temp., 53°.—In the east district, Mr. James Baynes, jun., reports that the gas supplied by the Sutton, Southcoates, and Drypool Gas Company during January gave the following results:—

	Max.		Min.		Mean.
Illuminating power standard sperm candles	15·73	..	15·65	..	15·69
Grains of sulphur per 100 cubic feet . . .	—	..	—	..	11·67
Grains of ammonia per 100 cubic feet . .	—	..	—	..	10·40

Mean barometer and temperature in experiment-room:—Bar., 29·85; temp., 55°.

WASTE OF WATER AT WARWICK.—At the meeting of the Warwick Town Council on the 13th inst., an important report was read from Mr. Pritchard, the engineer, respecting the waste of water now going on in the town. He reported that the new supply of water had been given to the town during the past month for about 15 hours per day, and for about a week during the whole of the 24 hours. When the supply was for 15 hours the consumption was 310,000 gallons, being at the rate of 28 gallons per head per diem; and while it was on for 24 hours the consumption was 470,000 gallons, being at the rate of 42·7 gallons per head. This showed a total waste of 16,000 gallons per hour during the night time. Mr. Pritchard advised the council to take immediate steps to check this waste, as it was scarcely reasonable to expect the supply of water to be equal to a demand twice as large as was originally intended. To secure this result he recommended either an alteration in the fittings, or the fixing of a meter to every service in the town, the cost to be charged to the general district rate. If that were done, and the water sold out at the rate of 6d. per 1000 gallons, a very handsome revenue would be obtained. The report was referred to the Water-Works Committee for consideration.

BODMIN GAS CONSUMERS COMPANY.—The twelfth annual meeting was held in the Guildhall on Monday evening, Feb. 5, when the principal shareholders were present. The directors recommended, in their report, a dividend of £8 per cent. They had been enabled to make, they stated, a further reduction from 6s. to 5s. 9d. per 1000 feet, with the usual discount of 6d. per 1000 feet. Three years since the price was 6s. 6d., but it now stood at 5s. 3d. to those who made prompt payment, being a reduction of 1s. 3d. in four years, which they considered very satisfactory to their gas consumers. Two of their directors—Messrs. S. Hicks and J. Beswetherick—retired by rotation, but were eligible for re-election. Two auditors also—Messrs. E. T. Crabb and J. R. Collins—retired, and were eligible for re-election. The directors had received a communication from the War Department as to on what terms the company were prepared to supply the military department. Negotiations were now pending between them, and they ask for power to increase their capital by the issue of additional shares, in case they should find it necessary for that purpose. The balance of cash in their hands was £489 16s. 3d. The consumption of gas during the past year had been the greatest on record. The report was adopted, and the previous directors and auditors were re-elected. The quality of the gas during the past year, they said, had been exceedingly good on the whole; and great credit was due to the company's manager, Mr. Thomas, who had conducted the works with much ability. His suggestions had been considered in reference to the works, and most ably carried out by him. There had been an increase of between 400,000 and 500,000 feet during the past year over the previous year, and the waste had been the least on record of the company. A vote of thanks having been passed to the chairman (Mr. S. Hicks), the directors, and auditors, the proceedings closed.

LEICESTER GAS COMPANY.—A special meeting of this company was held on the 12th inst., to consider the provisions of the Bill promoted by the directors in the present session. The chairman (Mr. Hutchinson) explained that the object of the Bill was the establishment of additional works for the manufacture and supply of gas to the town. He thought he mentioned, at one of their meetings last year, that the directors had in contemplation the desirability of providing works to a larger extent than had been the case for many years past. The subject was seriously discussed by the directors last autumn, and they were unanimously of opinion that the time was come when they must provide on a lager scale for the ever increasing demands for gas in the town. There were three cardinal points to be considered in the establishment of gas-works. One was the suitability of the site as regarded levels, and its connexion with a railway and canal. They had found those requisites, as they believed, in the vicinity of the Aylestone Road. It was an eligible site with reference to levels, and it was also in close proximity to the Leicester and Burton Branch of the Midland Railway, and to the Union Canal. There was also another requisite to be considered, and that was that the site should be as far away from dwelling-houses as possible, and, in looking about the town they did not think they could find any land which would be less of a nuisance in that respect than the land which they had scheduled, near the Aylestone Road. The reason why they were obliged to go to another district to establish the new works was because the land they had available at the works near Belgrave Gate was almost entirely exhausted. In selecting a site they had to consider its suitability as regarded levels, and connexion with railway and canal. The subject had been carefully considered by the directors and the engineers, and they thought the site selected a suitable one. After replying to some inquiries by shareholders, the chairman moved that the Bill be approved, which was put and carried.

HALIFAX WATER SUPPLY.—The quarterly report of the Corporation Water-Works Committee states that "the quantity of water in store at the last fortnightly meeting of the committee, held on the 23rd of January, was 679,034,000 gallons, being 175,341,000 gallons more than the quantity reported at the first meeting of the committee, which was held in November last, and 42,428,000 gallons more than the quantity in store on the 23rd of January, 1876. The reservoirs may now be said to be practically full. The committee are happy to report that the agreement with the Clifton Water Supply Company, Limited, for a supply of water to a portion of the township of Hartshead-cum-Clifton has at length been settled, the following being the substance of the terms:—The price to be 9d. per 1000 gallons for a period of 20 years; a minimum of 85,000 gallons per week to be paid for by the company, whether used or not; the maximum quantity which the corporation are bound to supply is 210,000 gallons per week. The water will be measured by a meter fixed at Clifton Bridge. The committee are also happy to state that a settlement has been arrived at with the Rastrick Water-Works Company with regard to the amount in dispute for interest, &c., on the main-pipe between Hove Edge and the district of Rastrick, which is a 14-inch main, conveying water not only to Rastrick, but also to the Savile estates at Thornhill and Soothill. Consequent upon drainage operations, which the Board of Works Committee found it necessary to carry out in Spring Hall Lane, a portion of the stone conduit conveying pure water between Pellon and Victoria reservoir has fallen in. This circumstance led the committee to instruct Mr. Paskin, the water-works superintendent, to make a thorough examination of the

conduit between the before-mentioned points, and although his report thereon has not yet been laid before the committee, the probability is that it will be found necessary to reconstruct this work in order to prevent all risk of contamination of the water in its passage through a locality which is now becoming populous, and also to prevent loss of water."

Batley Corporation Water-Works.—Mr. F. Bateman, C.E., has made the following report to the Water-Works Committee on the condition of the Riding Wood reservoir:—"On the 30th ult. I had the opportunity of examining the Riding Wood reservoir, which was then within 6 feet 6 inches of being full of water. In the course of the previous night there had been nearly 2 inches of rain, and every spring and stream was swollen in volume. Issues of water had for some time been observed to have occurred when water was contained in the reservoir, which was attributed to leakages from the reservoir. In order to ascertain this and other particulars, the reservoir, after being first nearly filled, was drawn down till the leakages disappeared. Gauges were put down at every spot where water issued, the reservoir was re-filled, and the quantity escaping carefully measured. The result is very satisfactory. There is no doubt that water does escape from the reservoir, but it is perfectly clear, and in no great quantity. No waste or mischief whatever is taking place, the escape does not take place through the artificial work of the embankment, but most probably through the fissures of a bed of rock on the left side of the valley, which crops out in the upper part of the reservoir, passes under the puddle trench, which has been filled with hydraulic concrete, and reappears in the valley below the bank. The whole quantity escaping scarcely amounts to a considerable spring, and so long as it remains pure, as at present, not the slightest danger is to be apprehended. The leakage first appears when the water rises to within 26 feet of the top of the waste weir—it amounts to about 200,000 gallons per day when the water is about 17 feet below top level, and to about 300,000 gallons when within 5 or 6 feet. The whole of this may be rendered available either by being taken direct to Batley, or given in compensation to the river. The Yateholme reservoir was full, and water running over the waste weir. Both here and at Riding Wood the works in every part have been most substantially executed, and are in perfect condition, and I congratulate the corporation on what I consider the successful completion of so much of the undertaking as they have carried out."

Eastbourne Gas Company.—The following is the report of the directors to be presented at the ordinary meeting of the company to be held on the 26th inst.:—"In presenting the accompanying accounts for the half year ending the 31st of December last, the directors are glad to be able to congratulate the shareholders upon the continued prosperity of the company. It will be seen that the sum of £1346 10s. 6d. has been expended during the past half year on the capital account, in the enlargement of the coal-stores, the building of a station-meter house, the purchase of weigh-bridges, and in the laying down of new mains, service-pipes, &c., and this outlay has exhausted the balance due at the date of the last balance-sheet, and leaves a deficiency on the capital account of £239 8s. 4d. The increase in the number of private consumers and of the public lamps has rendered it necessary for the directors to make provision for increased storeage room; and they propose to obtain plans for, and to erect without delay, another gasholder and additional purifiers, and to extend the present retort-house. In order to be able to carry out these works, they will seek authority from the shareholders to raise a further sum of £5000, by the issue of 500 additional B shares of £10 each, under the provisions of the company's special Act of Parliament, and the Acts incorporated therewith, and these shares will be offered to the present shareholders *pro rata*. The notice of an extraordinary meeting of the company to give the directors the necessary powers accompanies this report. The revenue account preserves its elastic character; the receipts from consumers being largely in excess of those in the corresponding period of last year. The principal items of increase on the expenditure side of the accounts are for coals (a greater quantity having been received during the past six months), and for repairs and meters, the last account including a new station-meter just erected at the works, at a cost of £329. The directors have decided to sell all the residual products made at the works (except tar) by weight, instead of by measure, and have purchased the necessary weigh-bridges. The system came into operation on the 1st of January last, and they believe it will give greater satisfaction both to the purchasers and to the company. The assets and liabilities of the company to the 31st of December last having been taken into account, there is a balance of £3060 17s. 3d. available for dividend, and the directors recommend that a dividend at the rate of 7 per cent. per annum be declared and paid upon the £5000 capital in B shares, and a dividend at the rate of 10 per cent. per annum upon the £20,000 original capital of the company for the past half year, and a bonus of 5 per cent. upon the last-mentioned capital, on account of the deficiencies of the dividends paid in former years since the incorporation of the company. These payments will leave a balance of £885 17s. 3d. to be carried forward."

Bristol New Water-Works Company.—A public meeting was held at the Grand Hotel, Bristol, on the 7th inst., for the purpose of hearing explanations by the engineer and the promoters of the Bristol District Water Bill. Mr. Paskin explained the general objects of the Bill, and read the following report of Mr. Bateman:—"I have had the opportunity of seeing the observations by Mr. Brooke on the quantity of water pumped extending from March, 1871, to November, 1873, and again from December, 1874, to October, 1875. The least quantity registered was in December, 1871, when it amounted to 1,050,000 gallons. The greatest quantity after steady pumping was in December, 1872, when 2,400,000 gallons per day were raised. On studying these registers, I am of opinion that 2 million gallons per day may be relied upon on the average of a year, provided a reservoir to contain 200 days supply of an average deficiency of 200,000 gallons per day be constructed. I have accordingly laid out a reservoir at Frampton Cotterell to contain this quantity. Into this reservoir the water from the mine will be pumped, for which the existing engines and pumps seem to be sufficient." The report then went on to state that the plans show two reservoirs in addition to that at Frampton, one at Frenchay for local supplies, one at Westbury, nearly the highest ground near Bristol, and arrangements were made for a head of pressure 19 feet above that at present supplied by the existing company's reservoir. The report further states that the water is reported by Dr. Frankland to be of excellent quality, and much better than that now supplied to the city of Bristol. The report then proceeds as follows:—"The total cost of new works from Frampton Cotterell to Westbury Park reservoir, including engines, pipes, reservoirs, land, and contingencies, and an ample allowance for rendering every reservoir water-tight, will be about £98,000. Two million gallons of water per day are sufficient for the domestic supply of about 100,000 persons; the cost of redistribution to this number of persons will be about £50,000, making a total of, say, £150,000. If two million gallons of water per day be sold at 6d. per 1000 gallons (which is a low price when distributed), the income would be £18,000 per annum. From this must be deducted the annual cost of pumping the water and other expenses, which will probably amount to £4000, leaving £14,000 as net revenue. In this estimate nothing is allowed for the capital already sunk in the shaft and pumping engines at Frampton Cotterell. Whatever may be considered a fair equivalent for this outlay will have to be added. The total quantity of water which the present well will yield is insufficient for the full supply of Bristol and its suburbs, but it will form a most valuable addition to the present supply, will make up for the notorious deficiency of the present company, is better water than is now supplied, and is probably the cheapest water that can be obtained. A company established for its supply can hardly fail of success." A discussion arose as to the relative prices to be charged by the new company and those charged by the existing company, and it was stated that the prices proposed to be charged would be considerably below the prices charged at present. Ultimately it was resolved—"That this meeting, having heard the explanations of the engineer and directors, are of opinion that the additional supply of water proposed to be given by the Bristol District Water Bill would be a valuable and necessary addition to the present water supply, and that the Bill should receive the support of the city and district proposed to be served."

Register of New Patents.

APPLICATIONS FOR LETTERS PATENT.

523.—Thomas, J., Aberdare, Glamorgan, "Improvements in direct-acting steam-pumps." Feb. 7, 1877.

528.—Perrett, E., Westminster, "Improvements in filters." Feb. 7, 1877.

552.—Bennet, H., and Bostock, I., Rugeley, Stafford, "Improvements in pumps." Feb. 9, 1877.

556.—Lake, W. R., Southampton Buildings, London, "Improvements in water-engines and pumps." A communication. Feb. 9, 1877.

601.—Nawrocki, G. W. von, Berlin, "Improvements in water-meters." A communication. Feb. 14, 1877.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

3231.—Peebles, D. B., Edinburgh, "Improvements in apparatus for governing, or regulating and adjusting, or otherwise acting on the flow or pressure of illuminating gas; a part of the said improvements being also applicable to two-way or multiple-way valves for other fluids." Aug. 16, 1876.

3376.—Sieh, P., and Schwarz, T., Hamburg, Germany, "Improvements in gas regulating and saving apparatus." Aug. 28, 1876.

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FIG. 224.

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FIG. 225.

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WANTED, at the Reading Gas-Works, a steady and experienced METER REPAIRER. Used to both Wet and Dry Meters. The situation is a permanent one.
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The commencing salary will be £600 sterling per year.
Copies only of testimonials and references to be forwarded to No. 347, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED to Freight.—Two Screw Steamships will be required by the London Gas-light Company to freight, running continuously, for a term of Five or Seven years, and delivering Coals in the Thames at the Company's Wharf, Nine Elms. They must each deliver not less than 800 tons per voyage.
The Ships will have to be specially constructed for passing through the bridges crossing the Thames, to the above point. The depth of water provided at the Wharf will be 13 feet at high water, neap tides.
Further particulars may be obtained by application at the Company's Offices, 26, Southampton Street, Strand, London.
By order,
A. J. DOVE, Secretary.
Feb. 1, 1877.

FOR SALE, a Set of 6-in. Vertical CONDENSERS, with tar-box and all connexions complete.
May be seen, and price obtained, on application to the Southbank and Normanby Gaslight and Coke Company, Limited, Southbank, YORKSHIRE.

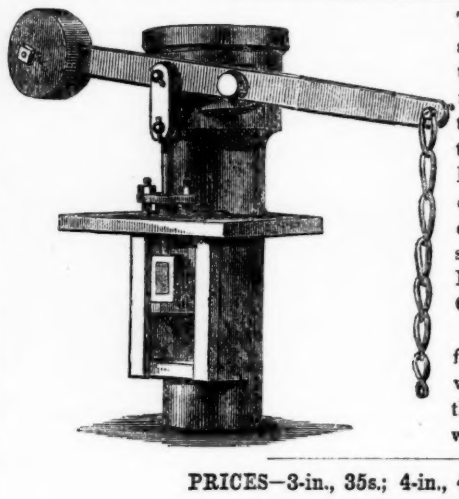
THE Swansea Gaslight Company have for immediate SALE, the following Plant:—
A 6-h.p. Patent Trunk Engine. (Beale.)
Exhauster to pass 15,000 feet per hour. (Beale.)
An 8-h.p. Grasshopper Engine. (Easton and Amos.)
Exhauster, 20,000 ft. per hour. (Beale.)
Tar, Liquor, and Water Pumps, Eccentrics, Shafting, and Driving Pulleys.
Wrought-iron Condenser, six vertical Legs, 30 ft. high, 24 in. by 6 in., with tar-boxes, dips, and syphons.
A set of four cast-iron Purifiers, 12 ft. square by 5 ft. deep, with galvanized wrought-iron covers, lifting apparatus, four tiers of wooden sieves, 10-in. connexions and valves.
May be seen at the Gas-Works, Swansea. The whole in perfect working order; replaced by plant of larger dimensions.
Further particulars may be obtained on application to Mr. THORNTON ANDREWS, SWANSEA.

THE Committee of the Wareham Coal Gas Company invite TENDERS for the supply of from 300 to 350 tons of Pelaw Main GAS COALS (best quality), to be delivered, free of charge, into lighters at Russell Quay. 100 tons to be delivered by the 1st of May next, the remainder by the 1st of September next.
Payment will be made four months after delivery.
Tenders to be sent in, addressed to me, on or before Monday, the 5th of March next.
F. FILLITER, Secretary.
Wareham, Dorset, Feb. 16, 1877.

HEBDEN BRIDGE GAS COMPANY.

THE Directors of the above Company are prepared to receive TENDERS for the construction and erection of Scrubber, Condensers, Engine, Exhauster, &c., and connexions for same.
Plans may be seen and all particulars obtained from Mr. Blackburn, Manager, Gas-Works.
Sealed tenders, endorsed "Tender for Scrubber, &c.," to be sent in not later than March 7th, and addressed to the Chairman, Gas-Works, Hebden Bridge.
The Directors do not bind themselves to accept the lowest or any tender.
By order,
THOMAS HORSFALL, Secretary.
Gas-Works, Hebden Bridge, Feb. 16, 1877.

MOORE'S PATENT DIP-PIPE.



THE advantages of this Dip will be seen from the engraving. It is thoroughly effectual in its working, removing the whole of the pressure of the hydraulic main from the retort, thus causing a great saving in gas. It is very easy of manipulation, requiring little care and attention; it cannot get out of order, and, when shut, works as an ordinary Dip-Pipe. No accumulation of carbon in retort. Can be fixed to existing H-pipes.

In ordering the Dip, the distance from top side of hydraulic main to water-level should be stated; also the Dip at which it is required to work when the valve is shut.

PRICES—3-in., 35s.; 4-in., 42s.; 5-in., 48s.

SOLE AGENT: J. GILL, GAS-WORKS, BRIDGENORTH,
To whom all communications should be addressed.
MAKERS: THE COALBROOKDALE COMPANY, SHROPSHIRE.

D. BRUCE PEEBLES & CO.,
ENGINEERS,
FOUNTAINBRIDGE WORKS, EDINBURGH,
MANUFACTURERS OF **WET AND DRY GAS-METERS;**
Patentees and Sole Manufacturers of "PEEBLES' GAS-GOVERNORS,"
FOR STATIONS, DISTRICTS, DWELLING-HOUSES, AND PUBLIC LAMPS,
OF WHICH UPWARDS OF 90,000 ARE NOW IN SUCCESSFUL USE.
"These Lamp-Governors are so superior that they are likely to supplant all others."—*Dr. Wm. Wallace, F.R.S.E., F.C.S.*

AWARDED SILVER MEDAL AT THE MANCHESTER EXHIBITION OF THE SOCIETY FOR THE PROMOTION OF SCIENTIFIC INDUSTRY.

BEALE'S
Improved Patent
GAS-EXHAUSTERS
WITH
ENGINES COMBINED.
Sole Makers,
GEORGE WALLER & CO.

Makers of
ENGINES, EXHAUSTERS,
INDEX and DISC GAS-VALVES,
HYDRAULIC MAIN VALVES,
BYE-PASS VALVES,
TAR, LIQUOR, and other PUMPS,
SCRUBBERS and PURIFIERS,
CONDENSERS, BOILERS, &c.

PHŒNIX ENGINEERING WORKS,
HOLLAND STREET, S.E.,
AND
STROUD, GLOUCESTERSHIRE.

Now ready, price One Shilling, No. 3 (to be continued Monthly) of

A TREATISE ON THE SCIENCE & PRACTICE

OF THE

Manufacture and Distribution

OF

COAL GAS.

LONDON: WILLIAM B. KING, 11, BOLT COURT, FLEET STREET,

OR OF ANY BOOKSELLER IN TOWN OR COUNTRY.

For the convenience of persons resident in remote districts, arrangements have been made by the Publisher to forward the "Treatise" by Post, securely packed on a wooden roller, at the cost of the number and postage only—viz., 1s. 2d. Monthly, or 7s. for the Half Year.

TO MANUFACTURERS

OF

GAS-ENGINES,

AND

APPARATUS FOR COOKING & HEATING BY GAS.

The Directors of the South Shields Gas Company are desirous of drawing the attention of their Consumers to the economy and advantages of Coal Gas for other purposes than that of Illumination—to Boiling, Stewing, Baking, Roasting, and all purposes of Cooking; for Heating Halls, Staircases, and Apartments; for Laundry purposes, Drying and Airing Clothes, and Ironing; for Heating Baths; for Trade purposes; and for producing Motive Power.

To further this object, the Directors invite the co-operation of manufacturers of apparatus for such purposes. It is proposed to have

A PUBLIC EXHIBITION

On the 9th, 10th, and 11th of APRIL next,

IN THE

FREE LIBRARY HALL OF THE BOROUGH;

to have the apparatus tested, to put some of it in action during the exhibition, and to award a silver medal to each of the successful competitors in the following classes:—

1. The most efficient and durable of cheap Portable Stoves for Boiling, Frying, and Grilling, suitable for a mechanic's home.
2. The most complete Family Gas Cooking Stove.
3. The best Gas Bath, Consumption of Gas, Expedition of Heating, and Price being observed.
4. The most simple Closed Apparatus for Heating Halls or Conservatories, either by Hot Air or Water.
5. The most cheerful Open Gas Fire with the least Consumption of Gas.
6. The cheapest efficient Gas-Engine.

Manufacturers may compete in all the classes, but not more than two prizes will be awarded to one manufacturer.

The award will be made by a Committee of three competent persons appointed by the Company.

The space being limited, though 80 feet by 40 feet, the Committee reserve the right of selecting or rejecting apparatus offered for exhibition. All apparatus must be delivered and removed free of cost to the Company, who will not be held responsible for any loss or breakage, though every care will be taken of the same by the Company's servants, who will arrange, fix, and work the apparatus unless otherwise desired.

Any suggestions for promoting the success of this movement will receive the attention of the Company's Engineer, to whom all communications are to be addressed.

W. J. WARNER, Engineer.

Gas-Works, South Shields, Feb. 15, 1877.

THE DIAMOND
ROCK-BORING COMPANY,

LIMITED,

CONTRACTORS, ARTESIAN WELL BORERS AND SINKERS.

Gold Medal for Rock-Boring Machinery . . . . Exhibition, 1873.
Silver Medal for „ „ . . . . Falmouth, 1875.

This Company now undertake the Sinking of Artesian Wells. Their system rivals all others, both for efficiency and speed, and in addition produces "Solid Cores" from the Rocks bored through, thus giving invaluable evidence of the strata passed through as the work progresses.—*Vide Brewers Journal, Oct.*, 1876, *and other papers.*

OFFICES:

2, WESTMINSTER CHAMBERS, LONDON, S.W.

A Young Engineer (21) desires an engagement in a Gas-Work, or Gas and Water Work, as ENGINEER'S ASSISTANT. Thorough knowledge of the construction of gas plant and its use, and the carbonisation of coal; also has had large experience in hydraulic engineering. First-rate draughtsman.
Address CO_2, 67, Barnsbury Road, LONDON, N.

DRAUGHTSMAN.

THE Gas Committee of the Halifax Corporation require the services of an efficient DRAUGHTSMAN. One who has had experience in gas apparatus preferred.
Applications, stating salary expected, and enclosing testimonials and references, to be sent to the Town-Clerk, Town-Hall, Halifax, endorsed "Application for Draughtsman," on or before Thursday, the 1st of March next.
Further information may be obtained from the undersigned. W. CARR, Gas Engineer.

LUDLOW UNION GAS COMPANY.

TO BE SOLD, Twenty Ordinary Shares of £5 each in the above Company, now paying 5 per cent., due the 1st of July yearly, and payable in October, with a probability of 6 per cent. in the future. If sold at once, the price will be, with the accruing dividend, £6 per share. Ordinary shares were last week sold for £6 10s. each.
Apply to Mr. C. HARPER, or to the Secretary, Mr. T. W. MONTFORD, Solicitor, both of LUDLOW.

CONDENSERS, &c., FOR SALE.

THE Aberavon Corporation have for immediate SALE Two Wrought-Iron Annular CONDENSERS, 7 feet 6 inches high by 18 inches diameter, with 12-inch internal tube, 5-inch connecting-pipes, tar-boxes, dips, &c., complete. The above are little less than new, and are in perfect working order, having been replaced by plant of larger dimensions.
Further particulars may be obtained of the TOWN-CLERK, Aberavon, SOUTH WALES.

THE Directors of the Morpeth Gas Company are prepared to receive TENDERS for the construction and erection complete, upon their premises, Morpeth, of a Single-Lift GASHOLDER, 60 feet diameter and 20 feet deep.
Drawings and specification may be seen, and further particulars obtained, at the Gas-Works.
Tenders, sealed and endorsed "Tender for Gasholder," to be sent in not later than Wednesday, the 7th day of March, 1877, addressed to J. MILLARD, Esq., Secretary, Gas Company, MORPETH.
The tender lowest in price will not necessarily be accepted

TO GASHOLDER MAKERS.

THE Town Council of the Borough of Bury are prepared to receive TENDERS for a Two-lift Telescopic GASHOLDER, 120 feet diameter by 35 feet deep.
Plans, specifications, and other particulars may be obtained on application to Mr. Kelsall, at the Gas-Works, Elton, Bury, Lancashire.
Sealed tenders, addressed to his Worship the Mayor, Gas-Works, Bury, endorsed "Tender for Gasholder," to be sent in on or before the 8th day of March next.
The Council do not bind themselves to accept the lowest or any tender. By order,
F. BULL, Town-Clerk.
Corporation Offices, Bank Street, Bury, Lancashire, Feb. 6, 1877.

TO GASHOLDER MAKERS.

THE Gas Committee of the Sowerby Bridge Local Board of Health are prepared to receive TENDERS for the construction and erection of a Telescopic GASHOLDER, 78 feet diameter.
Plans may be seen, and all particulars obtained, from Mr. Saville, Gas Engineer, at the Gas-Works.
Tenders to be sent in not later than Six o'clock on Thursday, March 1, addressed to the Chairman of the Gas Committee, and endorsed "Tender for Gasholder."
The Committee do not bind themselves to accept the lowest or any tender.
By order,
CHARLES BARSTOW, Solicitor,
Clerk to the Board.
Town-Hall, Sowerby Bridge, Feb. 8, 1877.

TO TAR DISTILLERS AND MANUFACTURING CHEMISTS.

THE Directors of the Staines and Egham Gas and Coke Company, Limited, are prepared to receive TENDERS for the whole of the TAR in stock, about 10,000 gallons, and about the same quantity of AMMONIACAL LIQUOR, strength about 10 oz.
The Tar to be removed by the Contractor, within one month of acceptance of tender, in his own vessels, and at his own cost in every particular, and paid for before removal.
The Directors do not bind themselves to accept the highest or any tender.
Tenders, marked "Tender for Tar," to be sent to the undersigned on or before the 27th of February inst.
Further particulars may be obtained of the Manager, at the Works, Egham.
JOHN ANTHONY ENGALL, Secretary.
Staines, Feb. 19, 1877.

TO GASHOLDER MAKERS AND OTHERS.

THE Directors of the Gravesend and Milton Gaslight Company are prepared to receive TENDERS for the construction and erection of a Single-lift GASHOLDER and TANK—the Holder to be 80 feet in diameter, with a depth of 20 feet; the Tank to be 20 feet in depth—to be erected at their Works, Canal Basin, Gravesend.
The plans and specification of the Holder lie for inspection at the Offices of the Company, No. 9, Berkley Crescent, Gravesend, between the hours of Ten and Five.
The tenders will be considered at a Board Meeting on Thursday, March 1, at Twelve o'clock noon, and tenders must be sent or delivered at the Company's Office as above before that time, sealed and addressed to the Directors, and endorsed "Tender for Gasholder."
Any further particulars can be obtained of the Superintendent, Mr. Marvin, at the Office or Works.
The Directors do not bind themselves to accept the lowest or any tender.
By order,
TUFNELL SOUTHGATE, Secretary.
Feb. 8, 1877.

TO TAR DISTILLERS AND OTHERS.

THE Directors of The Gaslight and Coke Company are prepared to receive TENDERS for the purchase of the whole or a portion of the TAR manufactured at their several stations, in accordance with particulars to be obtained at this Office on application to the undersigned.

By order.

JOHN ORWELL PHILLIPS, Secretary.

Chief Office, Horseferry Road, Westminster,
Feb. 19, 1877.

BOROUGH OF ROTHERHAM GAS-WORKS.

TO IRONFOUNDERS AND OTHERS.

THE Corporation of Rotherham are prepared to receive TENDERS for the delivery, according to specification, of 3416 Lineal Yards of GAS-MAINS, various sizes, and Special Pipes from 18 to 6 inch.

For drawings and specifications apply to Mr. Goodwin, Gas Manager, Rotherham.

Sealed tenders to be sent addressed to the Town-Clerk, endorsed "Tender for Gas-Mains," on or before Saturday, the 24th day of February, 1877.

The Corporation do not bind themselves to accept the lowest or any tender.

W. WHITFIELD, Town-Clerk.

Corporation Offices, Rotherham, Feb. 8, 1877.

BOROUGH OF ROTHERHAM GAS-WORKS.

TO FIRE-CLAY RETORT AND BRICK MANUFACTURERS AND OTHERS.

THE Corporation of Rotherham are prepared to receive TENDERS for the delivery at their Gas-Works in Frederick Street, Rotherham, 21 Middle Lengths, 9 ft. long by 21 inches by 15 in., by 3 in. thick; and 42 Mouthpiece Lengths, 4 ft. 6 in. by 21 in. by 15 in., by 4 in. at Mouthpiece and 3 in. body. Also 8400 Fire-Bricks of various sizes, and six tons of fine ground Fire-Clay. The above to be of the best quality.

For drawings and specifications apply to Mr. Goodwin, Gas Manager, Rotherham.

Sealed tenders to be sent in addressed to the Town-Clerk, endorsed "Tender for Retort and Bricks," on or before Saturday, the 24th of February, 1877.

The Corporation do not bind themselves to accept the lowest or any tender.

W. WHITFIELD, Town-Clerk.

Corporation Offices, Rotherham, Feb. 8, 1877.

LYTHAM IMPROVEMENT COMMISSIONERS.

TO GASHOLDER MAKERS.

THE Gas Committee of the above Board are prepared to receive TENDERS for the supply and erection, at their Gas-Works, of a Single-lift GAS-HOLDER, 60 feet diameter by 16 feet deep, in cast-iron tank.

Plans and specifications may be seen on application to Mr. Thomas Bower, Manager, Gas-Works, Lytham, and any further particulars may be had on application to Mr. A. Fleming, Scale Ford, Lancaster, to whom tenders must be sent under cover, endorsed "Tender for Gasholder and Tank," not later than Thursday, the 1st day of March next.

The Committee do not bind themselves to accept the lowest or any tender.

By order of the Committee,
THOS. BOWER, Gas Manager.

Lytham, Feb. 7, 1877.

MANCHESTER CORPORATION GAS-WORKS.

TO TAR DISTILLERS AND OTHERS.

THE Gas Committee are prepared to receive TENDERS for the purchase of the whole or portion of the GAS TAR to be produced at their Gaythorn and Rochdale Road Works for the term of one or more years, as may be agreed upon, commencing on March 1, 1878. The total quantity that will be produced during the first year is estimated at 15,000 tons or thereabouts.

Sealed tenders, addressed to the Chairman of the Gas Committee, City Hall, and endorsed "Tender for Gas Tar," must be delivered at this Office on or before the 20th day of March next.

The Committee do not bind themselves to accept the highest or any tender.

Further particulars as to conditions of contract, and forms of tender may be obtained on application to Mr. Jackson, at the Gas Office.

By order of the Gas Committee,
JOSEPH HERON, Town Clerk.

Gas Office, City Hall, Manchester, Jan. 27, 1877.

LLANELLY GAS-WORKS.

TO CONTRACTORS, BUILDERS, AND OTHERS.

CONTRACT No. 1.

THE Directors of the Llanelly Gaslight Company are prepared to receive TENDERS for the excavating and building of a Brick TANK, 92 ft. diameter and 25 ft. deep.

Drawings and specifications may be seen on application at the Gas-Works, Llanelly.

Sealed tenders to be sent in on or before Friday, March 2nd, addressed to the Chairman of the Gas Company, and endorsed "Tender for Tank."

The Company do not bind themselves to accept the lowest or any tender.

Further particulars may be obtained from the Engineer.

By order,
HENRY R. MARTIN, Engineer.

LLANELLY GAS-WORKS.

TO GASHOLDER MAKERS AND OTHERS.

CONTRACT No. 2.

THE Directors of the Llanelly Gaslight Company are prepared to receive TENDERS for the supplying, fixing, and completion of a GASHOLDER, 88 ft. diameter and 25 ft. deep, with all necessary guides, wheels, columns, and girders complete, to be erected at their Works, Llanelly.

Drawings and specifications may be seen on application at the Gas-Works, Llanelly.

Sealed tenders to be sent in on or before Friday, March 2nd, addressed to the Chairman of the Gas Company, and endorsed "Tender for Gasholder."

The Company do not bind themselves to accept the lowest or any tender.

Further particulars may be obtained from the Engineer.

By order,
HENRY R. MARTIN, Engineer.

THE THAMES BANK IRON COMPANY,
(Successors to LYNCH WHITE,)
SUPPLY FROM STOCK
CAST-IRON RETORTS, SOCKET-PIPES for GAS or WATER PURPOSES, FLANGE-PIPES for STEAM, RAIN-WATER PIPES and GUTTERS, HOT-WATER PIPES and BOILERS, and all requisite Connexions for same; also LAMP-COLUMNS, LAMPS, WROUGHT FRAMES, WROUGHT-IRON TUBING, &c., &c.
All kinds of Gas-Works Apparatus and General Castings made to Pattern or Drawing.
ADDRESS—
OLD BARGE WHARF, UPPER GROUND STREET, LONDON, S.E.

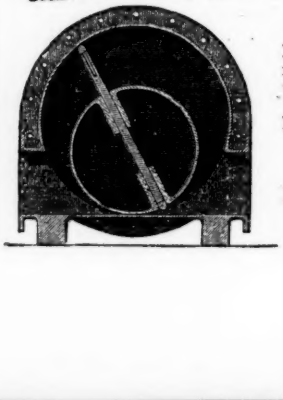
JAMES SNOWBALL & SONS,
STOURBRIDGE FIRE-CLAY WORKS, GATESHEAD-ON-TYNE,
MANUFACTURERS OF
FIRE-BRICKS, FIRE-CLAY LUMPS, QUARLS, GAS-RETORTS,
SANITARY PIPES, CHEMICAL PIPES, &c.
All made of the best quality of Fire-Clay, wrought from Whickham Colliery.
J. S. & SONS having during the past year erected large Works at Derwenthaugh, in addition to their old Works at Gateshead-on-Tyne, are in a position to supply large orders with the greatest despatch.

GEORGE ORME & CO.,
ATLAS METER-WORKS, OLDHAM,
MANUFACTURERS OF
WET AND DRY GAS-METERS,
STATION-METERS, GOVERNORS,
PRESSURE AND EXHAUST REGISTERS,
LAMP-METERS IN CAST-IRON BOXES,
And every Description of Gas Apparatus.

E. J. & J. PEARSON,
DELPH AND TINTAM ABBEY FIRE-BRICK WORKS,
STOURBRIDGE,
MANUFACTURERS OF
FIRE-CLAY RETORTS
And all descriptions of FIRE-BRICKS.
PRICES ON APPLICATION.

JAMES MILNE & SON,
GAS ENGINEERS,
Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,
EDINBURGH, AND
2, KING EDWARD STREET,
NEWGATE STREET, LONDON.
Meter Works in London—2, CROSS STREET, WILDERNESS ROW, E.C.
STATION-METERS, GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,
And every description of Gas-Fittings and Gas Apparatus.

J. BEALE'S PATENT GAS EXHAUSTER.



BEALE'S CONTINUOUSLY ACTING
GAS EXHAUSTERS
ARE NOW MANUFACTURED BY
B. DONKIN & CO.
MR. J. BEALE, of East Greenwich, having retired from business, has made an arrangement with B. DONKIN & CO. for the sole manufacture of his Patent Solid-Slide Gas Exhausters. B. D. & Co. also make Steam-Engines to drive Gas Exhausters direct or otherwise, and Gas-Valves.
Estimates and Prices on application to
B. DONKIN & CO.,
ENGINEERS & IRONFOUNDERS,
55a, BLUE ANCHOR ROAD, BERMONDSEY,
LONDON, S.E.

GEORGE ANDERSON,

GAS AND CONSULTING ENGINEER,

35A, GREAT GEORGE STREET,

WESTMINSTER, S.W.

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS—giving great Economy of Fuel.

STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES.

FUEL-MACHINE, for Compressing Breeze and Tar.

WASHERS, SCRUBBERS, and PURIFIERS, that Economize Space and Cost.

N.B.—Pamphlet, with Eighteen Illustrations of the foregoing, with letterpress on the construction of Gas-Works, post free, 2s. 6d.

J. T. B. PORTER & CO.,

GAS ENGINEERS & MANUFACTURERS,

IRONFOUNDERS AND CONTRACTORS,

GOWTS BRIDGE WORKS,

LINCOLN.

ESTIMATES FOR GAS-WORKS OF ANY SIZE.

REFERENCES TO 500 WORKS ALREADY ERECTED.

N.B.—It is most particularly requested that all Communications be addressed to the FIRM ONLY, as circumstances have arisen which render this necessary.

S. OWENS & CO.,

WHITEFRIARS STREET, FLEET STREET, LONDON, E.C.,

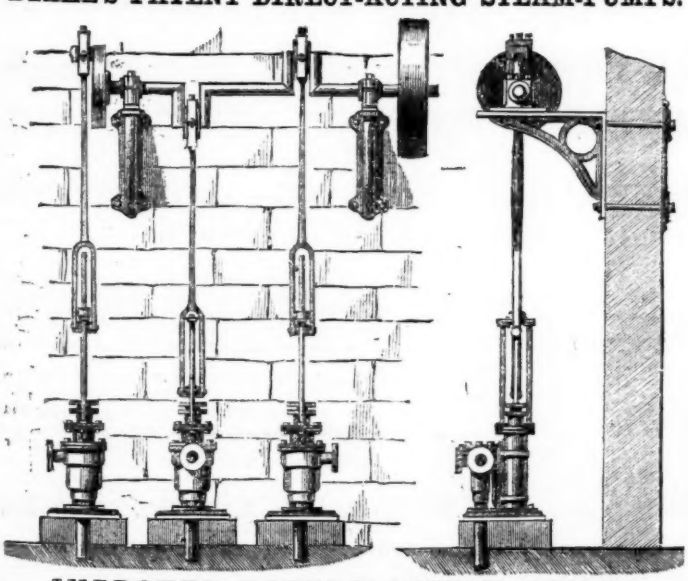
Hydraulic Engineers,

AND MANUFACTURERS OF

PUMPING MACHINERY of every Description.

SOLE LICENSEES AND MANUFACTURERS FOR GREAT BRITAIN OF

BLAKE'S PATENT DIRECT-ACTING STEAM-PUMPS.



IMPROVED DOUBLE-ACTION PUMPS.

For Water. For Tar. For Ammoniacal Liquor.

This illustration shows an arrangement of three (No. 179) Improved Double-Action Pumps driven from the same crank-shaft, as frequently supplied for use in Gas and Chemical Works. The suction and discharge pipes can be arranged for drawing from and delivering in any required direction.

These Pumps have been supplied to nearly all the large Gas Companies and Chemical Works, both for Pumping Water, Tar, and Ammoniacal Liquor.

GAS SYPHON PUMPS, IN COPPER OR SHEET IRON, ALWAYS IN STOCK.

Illustrated Catalogues sent post free on application.

HAMPTON COURT GAS COMPANY.

TO BE SOLD cheap, as they stand, Four Cast-Iron PURIFIERS, 8 feet square, with wrought-iron covers, wood sieves, columns, girders, and lifting apparatus complete; and 8-inch Hydraulic Centre Valve and connexions, all in good condition.

Apply to Mr. E. PRICE, Engineer, Gas-Works, HAMPTON WICK.

WANTED, Spent Oxide. The Sheffield Chemical Company, Attercliffe, are prepared to PURCHASE large or small quantities.

Address, with particulars, the Proprietors, HORNBY, FAIRBURN, AND CO.

W. HAYES, Contractor for Laying Gas and Water Pipes in all parts of the country at very low prices.

Estimates furnished on application to W. HAYES, 15, Southam Street West, Kensal Road, Westbourne Park, LONDON.

PAMPHLET ON GAS.

COOKING AND HEATING.

HINTS ON GAS-BURNERS, &c.

For GAS COMPANIES to distribute to their Gas Consumers.

Specimen Copy by post Threepence, from the Author,

MAGNUS OHREN, Gas-Works, Sydenham, S.E.

BAILEY'S Patented Inventions are now in extensive use wherever steam is known. Bailey's Patent Steam Gauges, Pyrometers, Water Gauge Cocks, Test Pumps, Fusible Plugs, Steam and Water Valves, Safety Valves, Junction Valves, Pumps, Tell-Tales, Recorders, Lightning Conductors, Electric Telegraphs, Turret Clocks, Steam Joint Cement, Lifting Jacks, Boiler Feeders, Lime Catcher and Separator, Injectors and Ejectors, and every description of first-class Brass Work for Engines and Boilers. Gas-Works Managers who have not our large book should send for it.

16th edition, 1000 engravings, 4to., post free 3s. 6d. in stamps. weight 10 oz., cost of production £1000,

BAILEY'S Illustrated Inventions, containing details and prices of goods in our five several departments:—(1) Brass Foundry, Steam Gauges, Indicators, Feeders, and Fittings; (2) Engineers Sundries, Small Tools, and Stores; (3) Machine Pump and Fire Engine; (4) Turret Clock, &c.; (5) Electric Telegraph, A B C Instruments, Bells, and Apparatus.

W. H. BAILEY and Co., Albion Works, Salford, LANCASHIRE.

T. NEWBIGGING,

CONSULTING GAS ENGINEER,

5, NORFOLK STREET, MANCHESTER.

JOHN ROMANS, C.E., F.G.S.E.,

CONSULTING GAS ENGINEER

AND

CANNEL COAL FACTOR,

30, St. Andrew Square, EDINBURGH.

Plans and Estimates furnished; Gas-Works, Apparatus, Pipes, Machinery, Fire Goods, &c., supplied, or Attested and Shipped for Exportation.

GAS-WORKS TAKEN ON LEASE.

Mr. ROMANS has for upwards of 30 years been practically engaged in the Manufacture of Gas, and has, by extensive experiments, ascertained that by JUDICIOUS INTERMIXTURE of the lighter with the heavier gases, much of the rich Hydrocarbons CAN BE SAVED, which otherwise ARE LOST, during the process of manufacture. He is therefore enabled to give advice to those who favour him with their orders for Cannel, as to the class which will secure for their standard of illuminating power the HIGHEST ADVANTAGEOUS RESULTS.

ANALYSIS AND PRICES FORWARDED ON APPLICATION.

HEBBURN MAIN GAS COALS.

T. Stone, Esq., of Weymouth, writes on Nov. 17, 1876: "I have used about 12,000 tons of this Coal, with, I think, the best possible results, although not always under the most favourable circumstances. My Coal account made up to Midsummer last showed a makeage of 10,524 cubic feet per ton of 14¼-candle gas, and not a hundredweight of Cannel used. This statement would, I know, be incredible to many men, and may provoke the remark, 'How much of it is paid for?' For the gratification of such, I have to say that, of the above quantity, 9866 cubic feet per ton of Coal carbonized were brought to charge and duly paid for, with the exception of about 6s. per cent. for bad debts. The coke is of excellent quality. The above facts I hold to be a greater recommendation to your Coal than any words of mine could be."

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The Forms of Account, which have been specially designed by A. L. to meet the requirements of the Gas-Works Clauses Amendment Act, 1871, are now in use by many Gas Companies, and have been universally approved.

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Water Companies Accounts also prepared and adjusted.

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Light Blue.	Cream Colour.
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Imperial Stone.	Light Stone.
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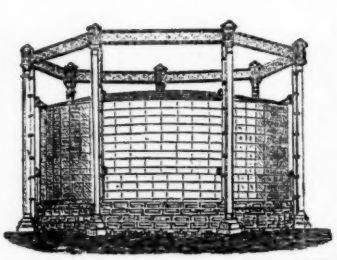

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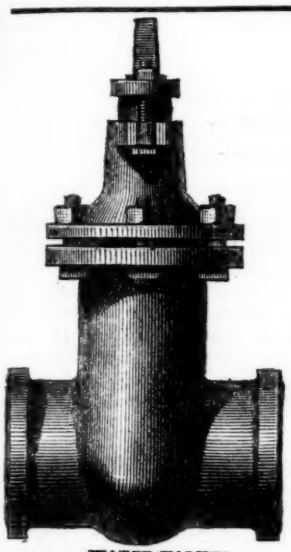

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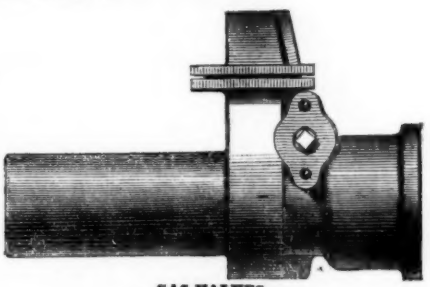

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By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the important results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

They are, in all cases, constructed under guarantees to perfectly perform their work. They are now extensively used in the largest gas-works of London and the chief cities of Europe, the number in use exceeds **one hundred,** and their perfect efficiency and profit to a gas company have been fully established with every variety of coal used in Europe. References can be given to the largest gas-works in Europe.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals, generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

They contain their own engine power, requiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

Applications relating to dimensions and prices should be addressed to us. C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to Mr. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

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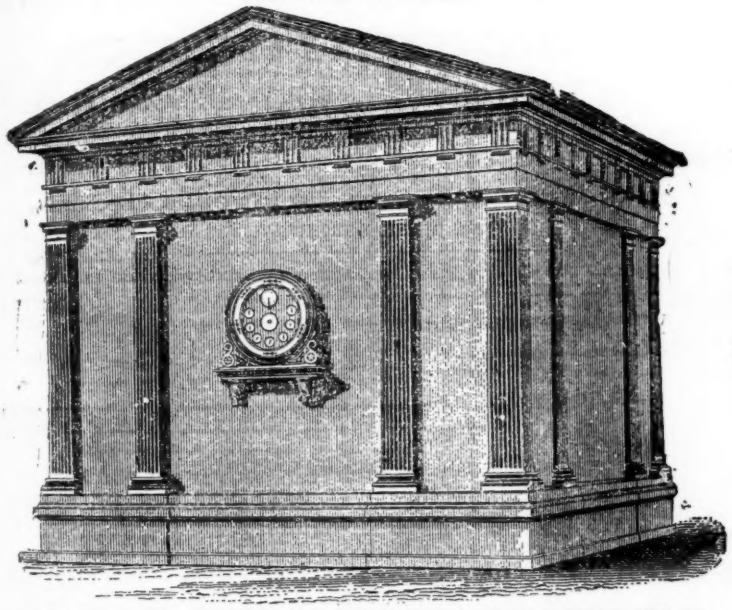

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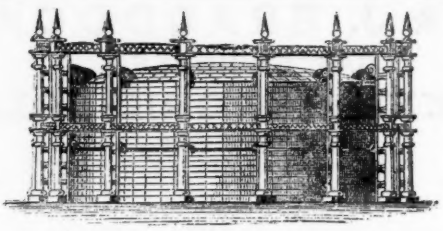
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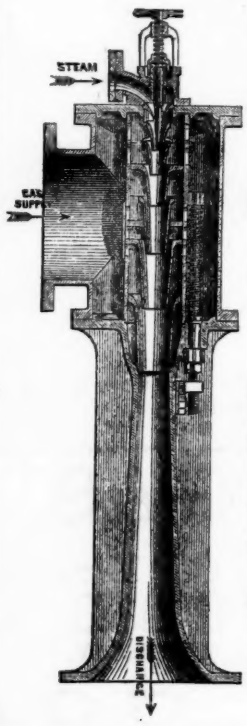

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Analysis by F. J. EVANS, Esq., Chartered Gas Company, Horseferry Road, Westminster:—
(COPY.)

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Silkstone Nuts . . .	10·800	15·85	12·66 cwt.....	6·0	0·69

NOTE.—The illuminating power of the gas was tested by the standard burner now used in London by the Gas Referees, under the City of London Gas Act, 1868.
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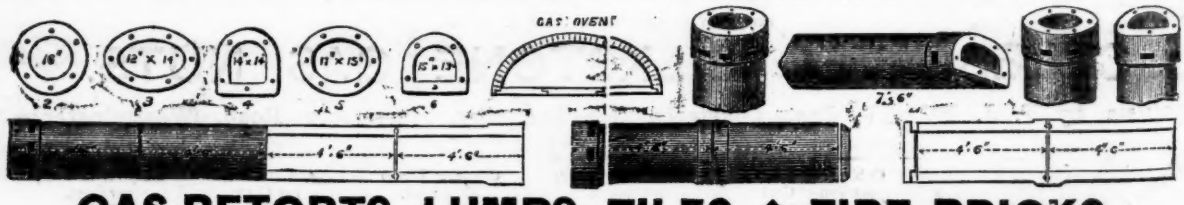

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